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IMPLICATIONS OF VENTURE ANALYSIS

by

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A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled, "Implications of Venture Analysis" submitted by T.E. Taylor, in partial fulfilment of the requirements for the degree of Master of Business Administration.

ABSTRACT

Successful ventures often threaten to make obsolete those existing products that may be the basis of a company's present business. No company deliberately causes its own obsolescence. Yet, if a business is to face obsolescence, there are obvious advantages if that company itself is the cause. Venturing can be regarded as a form of survival insurance, occasionally reinvigorating the company and preserving its continuity.

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I

INTRODUCTION

Business exists in a changing environment, oblivious to any particular firm. In order to survive, firms must adapt to this environment, constantly striving for growth. Common to all growth companies and growth industries are new markets and new products. Essential for sustaining this growth is a willingness to diversify and enter rapidly growing but hazardous technical areas. In most industries, competitive pressures require a continuing flow of new products and improvements to existing ones if company sales and profits are to be sustained or enhanced. New products are a major contribution to company growth, a primary influence on profit performance, and a key factor in business planning.[1] Because of these factors, no phase of marketing management has received greater attention in industry during recent years than has new product planning.

Current inflationary pressures in our economy are not likely to result in less emphasis on new products. They will probably lead to an increase in overall research and development and more new technology as firms continue to battle for the consumer dollar. The key to competitive survival and success is new product planning to ensure that the right product is available at the right time and in the right place. It is a crucially important aspect of present day marketing.

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1. Thomas L. Berg and Abe Shuchman, Product Strategy and Management, (New York: Holt, Rinehart and Winston, Inc., 1963), pp. 26-27.

Handicapping the new product planning function is the risk of failure. The mortality rate for new products has been estimated as high as 80 - 95%.[2] In a 1960 study of 922 new products introduced by 65 concerns, 49 percent were considered to be successful, 34 percent were in the doubtful category, and only 17 percent were outright failures.[3] However, most of the doubtful ones eventually became failures and the failure rate would have been substanially greater if those products which never reached the commercialization stage, on which management spent considerable time and money, had also been included in the calculations. Also, since the sample was restricted to large firms, it could be argued that the failure rate would have been much higher had smaller and less sophisticated firms been included.

With such a high mortality rate suspended over new product planning, there is little wonder that anxiety and confusion exists. The only way to avoid all mistakes is never to do anything new or creative. The result is an end to growth. The winner is the company that is willing to make mistakes, but organizes to keep them fewer and less severe than competitors. The best way to do this is to keep new products in line with the size of the opportunities and probabilities of payoff.

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[2] Viewpoints on the mortality rate for new products are presented by the authors in "A Checklist for New Industrial Products", Journal of Marketing, Vol. 24 (July 1959) pp. 70-73; Product Strategy and Management, (New York: Holt, Rinehart and Winston, Inc. 1963), p. 37; and Management of New Products. (New York: Booz, Allen & Hamilton, Inc., 1960), pp. 14-15.

[3] Management of New Products, (New York: Booz, Allen & Hamilton, Inc., 1960), pp. 14-15.

Sometimes this will mean deciding not to go ahead blindly, or to postpone action while accumulating information; sometimes it will mean accepting a challenge that otherwise would be discarded.

It has been said that "... there is no such thing as a growth industry. There are only companies organized and operated to capitalize on growth opportunities."[4] The ability to capitalize on a new product opportunity requires the use of new product analytical techniques which include as many related factors as possible, attempting to analyze the risks and probabilities of success, providing the information required to make correct decisions concerning the new product's potential early in its development. The development stages of a new product are so complex and vital that literally a whole new management science is required to direct them. One such science is "Venture Management".

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4. "Key Factors in Corporate Growth", Management Consultant, (1962 Series, Number 2), p. 4.

II

VENTURE MANAGEMENT

Traditionally, several conditions have obstructed the process of innovation. Businesses, organized to run today's business with little thought to the future, have not accentuated the new product process, neglecting the development of products that will answer the needs of society in future years. The typical organization geared to functional activities breeds resistance to change. Critical decisions on proposed products are made by personnel insufficiently acquainted with the product and the consequences of the decisions. Without a definite new product strategy, too many decision makers create disorder, indecision results in costly delays, and authority for projects is disseminated among many. Under traditional management structures, it is difficult for top executives to recognize the importance of new products for the future of the organization and to allocate sufficient priority to this area. The result has been unpredictable and random innovation.

These problems can be solved allowing the new product development process to expand and mature. The solution is a new approach called "venture management", an "... entrepreneurial concept that enjoys remarkable freedom from typical corporate constraints in seeking out growth opportunities and in preparing to capitalize on them".[5]

The "venture managment" approach to new product development and profitable commercialization provides a unique and valuable expansion to

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[5] M. Hanan, "Corporate Growth Through Venture Management", Harvard Business Review, Vol. 47 (Jan. - Feb., 1969), p. 44.

the innovation process. This approach is based on the "mission" approach, viewing each new product proposal as a "venture" and assigning a "venture team" to manage each venture from infancy to termination or commercialization.

The venture concept attempts to increase predictability and decrease randomness in new product development. It attempts to make venturing a continuous process rather than intermittant or spasmatic. And it attempts to promote innovation in entirely new fields. Essential to the concept are six conditions which produce independence, substance, and zeal within a venture team:[6]

1. A venture is unidirectional. It has but one objective, that of cultivating new products.
2. A venture is multidisciplinary. It employes skills from all sciences.
3. A venture is eclectic. It can select what is best from various fields, unrestrained by traditional technologies.
4. A venture is entrepreneurial. It approaches its task in a business like manner, weighing costs against profit potentials.
5. A venture is judicious. It attempts to consider only the facts, ignoring emotional inclinations.
6. A venture is kinetic. It is dynamic in nature, accepting change as being inescapable and certain.

The venture team occupies a position seldom found in existing organizations. Composed of a small number of representatives from a variety of disciplines, venture teams seek out new products to meet the needs of future markets. The four major functional areas involved in any venture are engineering, marketing, manufacturing, and finance.

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[6] Ibid., pp. 45-47.

These four activities have a direct bearing on the product, each with differing objectives to meet. By making venturing the full time profession of representatives of these activities, venture management attempts to eliminate over-emphasis on any one of these areas which could distort what might have been a good new product idea or venture. An article on "How to Organize for New Products" listed types of product failures which illustrate improper emphasis or lack of emphasis by one of these functional activities:[7]

1. "The 'bootleg' project in the laboratory that management does not know about." (Too much engineering.)
2. "The 'bottomless hole' product that took three times as long and cost five times as much as expected, and finally got to the market behind all other competitors." (Insufficient financial attention.)
3. "The product with 'bugs' that were hidden until 10,000 came back from consumers." (No manufacturing testing.)
4. "The product that had all the sales 'engineered out of it.'" (Lack of marketing follow-through.)

The objective of venture management is to consolidate new product planning by using venture teams to ensure that each of the functional areas affecting the product are properly related. Before any progress can be made toward supplying this proper balance, certain objectives regarding product scope must be established.

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7. S.C. Johnson and C. Jones, "How to Organize for New Products," Harvard Business Review, Vol. 35 (May - June, 1957), p. 50.

A. Venturing Objectives

Planning cannot be accomplished without knowledge of the characteristics of the company. This knowledge must be available to answer questions such as: Who are we? What do we do? Where are we? Where do we want to go? What money will we have to get there? The answers will provide a basis for all planning which goes beyond the immediate budget period, particularly for product planning. To find the answers, management must interpret the company character and define the company objectives. If plans are to make sense in a particular company, its particular strengths and weaknesses must be determined along with the particular set of product values which it may stand for. The analysis of the company's character is as important as the plan itself.[8]

Company objectives may be divided into profit and growth objectives and specific market and product objectives. Growth and profitability objectives are high on the list of those that make up the company character. Growth can come from the following sources:[9]

1. Growing sales of existing products to existing customers.
2. New customers for existing products.
3. New products for existing customers.
4. New products for new customers.
5. Growing sales that result from acquisition or merger.
6. Growing sales of byproduct services, for example, engineering and study contracts.

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8. Gerd D. Wallenstein, Concept and Practice of Product Planning, (American Management Association, Inc., 1968), p. 26.

9. Ibid., pp. 35-36.

Growth in any of these areas does not result solely from inventiveness or aggressiveness. It also requires money and since growth has to be paid for, it is desireable to be selective about it. In short, growth should be profitable and objectives should be established determining the acceptable level of profitability as well as the acceptable level of growth.

Certain basic assumptions relative to the future conditions under which the company will operate must be made before the company objectives can be determined. They will naturally include a projection of economic conditions:[10]

1. "Do we assume that the growth of the gross national product will continue at approximately the current rate?
2. Is technology at a plateau in our particular field of development, or are we in an exponential period of growth?
3. Will competition in our product-scope field become stronger, weaken, or remain the same?
4. Is the character of our company organization going to change over the next five years, or do we base our plans on the same type of operations?"

Based on these assumptions concerning future conditions, the first step in venture management is to formulate obtainable objectives. This implies a complete audit of company strengths and weaknesses to determine what the company may reasonably expect to accomplish by a new product program.

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10. Elizabeth Marting, ed., Developing a Product Strategy, (New York: American Marketing Association, Inc., 1959), p. 51.

The key factor influencing the selection of new products for development and commercialization is the degree to which they fit or mesh with the present line. A high degree of product compatability exists when present plant, labor, equipment and manufacturing processes can be used in making new products. The establishment of venturing objectives has provided a basic framework for evaluating the venturing process. Objectives will indicate possible additions, delections, and major renovations to existing product lines. The company is now equipped to organize within that framework.

B. Ventrue Policy, Planning, and Strategy

Product decisions usually involve a product change, defined as "any conscious change in the company's offerings as viewed by the buyer."[11] Venture policy acts as a guide to these decisions and deals with such questions as:

1. Product or product line to be marketed.
2. Relationship among products in a product line.
3. The addition of new products and a review of existing products.

A venture policy is important, for a firm's success is ultimately determined by the acceptance of its products by consumers. This product success is not easy to obtain. It requires a thorough investigation into the product, its price, its promotion, and its place of marketing, commonly termed as the 4 - P's of marketing. In the past, all

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[11] John A. Howard, Marketing Management and Planning, rev. ed. (Homewood, Illinois: Richard D. Irwin, Inc., 1963), p. 293.

four areas of marketing were considered equally important. However in recent years, the basic nature of the product decision has attracted the attention of marketing thought. The consumer or market is now considered primary and the efforts of the marketeer should be to develop a product for a market instead of a market for a product.

Not always does the market preceed the product. Often the product comes first and a market is sought for it. However, whether the product or the market precedes, they jointly determine how the product will be priced and promoted. The product decision, reflecting the market conditions, is basic.

The nature of venture policy makes it a vital concern to top management. It should relect a firm's overall objectives. It involves the commitment of research, financial, and human resources. Venture policy affects the corporate growth and its use for innovation or improvement is the most powerful competitive weapon available. Corporations must either grow or adapt to survive and this depends directly on profitable sales which in turn are dependent on having the right product at the right time. Thus venture policy should be the heart of any business organization.[12]

The venture planning aspect of a venture policy consists of the mobilization of the optimum application of company resources to achieve the maximum profits through product research.[13] The approach

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[12] D.W. Karger and R.G. Murdick, "An Overall Look at Product Planning," Machine Design, Vol. 32 (March 31, 1960), p. 95.

[13] Ibid., p. 96.

taken to institute a venture strategy and methodology of analysis requires a full commitment by top management in the planning stage.

Even the simplest of new products are associated with risks and a wide range of difficulties. Lack of coordination between departments and technological problems cause delays, stretching the time from conception to commercialization of proposed ventures. Three elements leading to success which are most often missing from a venture plan are:[14]

1. Forward planning.
2. Coordination.
3. Communication.

A typical company shows many symptons suggesting a need for a systematic approach and an effective control for venture planning. Some of these symptons are:[15]

1. The executives who want new products but cannot agree on the kind of products they should be interested in.
2. Inventors who do not know what to invent.
3. Laboratories packed with development projects but with few projects coming out as new products and fewer being successful.
4. The idea man whose brain child was squashed for unexplained reasons.
5. The floating product idea which has been around for years but has never had a decision made on it.
6. The orphan project which goes on and on because no one has given it thought or made a decision to discard it.

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[14] J.H. Murphy, "New Products Need Special Management," Journal of Marketing, Vol. 26 (Oct., 1962), p. 46.

[15] Johnson, "How to Organize." p. 50.

7. The scientific triumph that had no market until someone started to investigate it.
8. Sales that jumped the gun ahead of production.

Coping with these variables and elements requires a complex model and a thorough statement of the problem. The decision model must help identify risks, indicate the extent of returns, suggest potential alternatives and locate areas for obtaining new information to reduce and clarify the uncertainties surrounding the alternatives. In all venture decisions, information needs are high and data sources diffuse. The conditions surrounding these decisions point to the need for a sound venture strategy with a clear understanding of the marketing target to be attacked. When preparing a strategy, firms should ask themselves who their customers are, what are they like, what they need, and base their venture strategy on the answers. Prepared in this manner, a venture strategy should overcome several organizational deficiencies suggested by Edgar A. Pessemier:[16]

1. Physically sound ideas for new ventures frequently lay dormat or develop slowly until the proper conditions appear.
2. Important new products frequently are invented or discovered by independent operators for small firms. Seldom do these innovators reap the full fruits of their contribution.
3. The stronger the institutional or industry traditions, the less likely it is that a proposal for significant change will receive a fair hearing. More often, the change is forced by circumstances external to the firm and industry.

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[16] Edgar A. Pessemier, "New Product Ventures," Business Horizons, Vol. XI (Number 4, August, 1968), pp. 17-18.

4. Established firms, often the large organizations, may have little incentive to innovate or adopt a new concept until after it is relatively well proven and/or becomes a competitive threat.

5. The poor acceptance of the venture by channels of distribution who may assume a position of prime importance.

Clarifying objectives and policies and preparing plans and strategies before potential ventures are added to the product line will eliminate needless profit dollars from being poured into development and distribution. The establishment of a sound venture policy and plan will facilitate the analysis of a proposed venture before it is developed.

1. Venturing - an Iterative Process

New product development or venturing is an iterative process. It is iterative in the sense that it is characterized by endlessly repeating adjustments of products to markets and markets to products. The discovery of a new product often leads to the discovery of new markets, and an examination of the needs of these markets may lead to further new products, and so on indefinitely. The process was once trial and error. A new product would be introduced and if successful, competitors would be attracted. If unsuccessful, the product would be removed from the market. The basic problem was lack of feed-back resulting in under or over estimates of the new product's market appeal.

The venturing concept provides a route for immediate feedback, enabling a venture team to estimate the probable reactions of consumers to a new product before large sums of money are committed. It stresses the sequential nature of decision making. A small investment is made in

concept testing, a slightly larger investment in evaluating alternative forms of the concept, a still larger investment in prototype testing, and a still larger investment again in test marketing - all before the actual commercialization of the new product.

Research in effect is simulated iteration. Instead of placing a new product on the market and waiting to ascertain its acceptance, then making necessary adaptive changes to increase its acceptance, venture management furnishes validated techniques to evaluate a new product before commercialization.

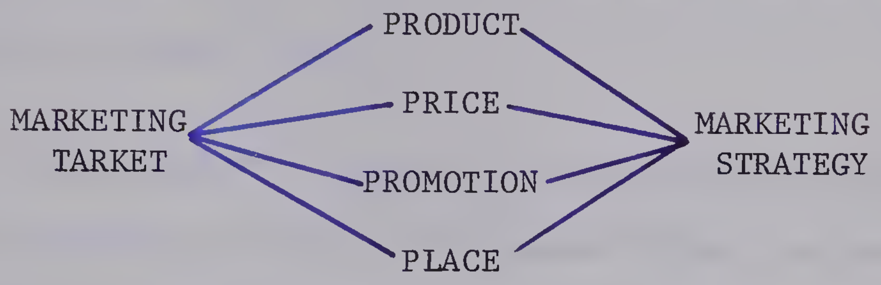
Venture management will reduce the costs of new product decisions through a rationalization of the new product development process. Over time, this rationalization can be achieved by defining a product line policy which specifies the firm's product objectives, the types of products and the markets they are to serve. Such a policy provides a framework giving direction to new product effort, establishing a set of criteria on which to base decisions, and focusing attention on the types of innovation holding the greatest promise for the firm. A far more consistent and systematic examination of proposed changes in the firm's product line results.

The stages involved in the evolution of the iteration concept for new product development are illustrated in Exhibit 1. Stage one is based on the 4 P's of marketing and the market. Stage two indicates the movement to increased emphasis on the product. The interaction between the firm and the market in developing new products is demonstrated in stage three.

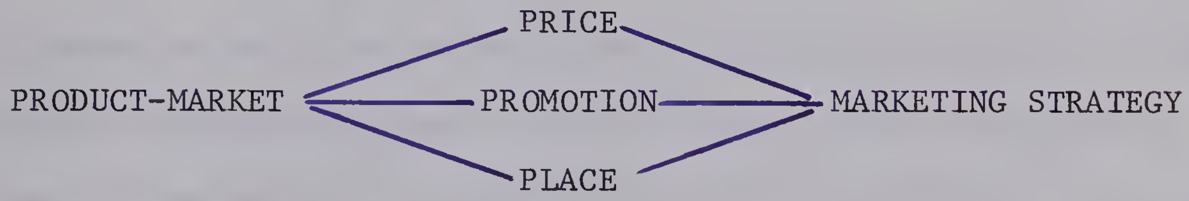
EXHIBIT 1

EVOLUTION OF THE ITERATION CONCEPT

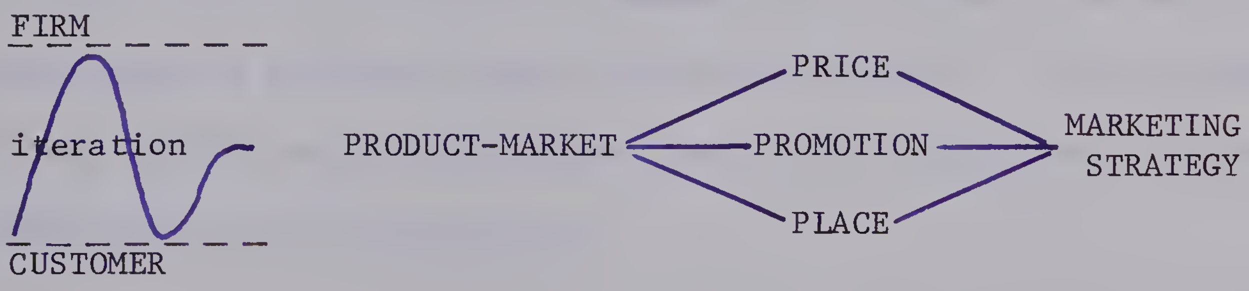
Stage One - The 4 P's and the Market



Stage Two - The Product Decision as Basic



Stage Three - Iteration in the Development of Products



Source: William H. Reynolds, Products and Markets, (New York: Appleton - Century - Crofts, 1969), Figures 1-3, pp. 6-8.

2. Developing a Venture Strategy

The preceeding section suggested the importance of venture management rationale in directing the efforts of venturing. This direction should be towards products compatible with the firm's objectives and resources. It should also be directed towards products which satisfy consumer needs.

The design of a venture strategy should elaborate on the direction specified by venture management objectives and policies. A venture strategy should consider as a part of the firm's capabilities, the financial and technological resources, the research, production and marketing facilities, and the available skilled manpower. The strategy is intended to mobilize and optimize the application of these company resources to achieve maximum profits through product leadership. The success of the venture strategy will rest on the accuracy and perfection management achieves in evaluating company strengths, determining venturing goals and organizing the venturing function. A successful method of looking at venture strategy within the framework of the total organization has been suggested by Delmar Karger and Robert Murdick.[17] The following check lists include certain basic requirements which they feel are generally applicable to all corporations:

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[17] Karger, "An Overall Look," pp. 97-99.

1. Check list for evaluating company strengths.

    a. Corporate Board:

        i) Make-up. Are the members old or young? Are they aggressive and willing to take chances?

        ii) Attitudes. How do the board members feel about new ventures, mergers, or acquisitions?

        iii) Perspective. Is the board dominated by any set of biases or prejudices which may affect venturing?

        iv) Experience. Are they experienced enough to guide product development or entry into completely new fields.

    b. Financial Position:

        i) Capital structure.

        ii) Retained income, credit, and availability of capital.

        iii) Contingent liabilities.

        iv) Flexibility of fiscal policies.

    c. Manpower:

        i) Managerial personnel. What are their qualifications, abilities, and potential for growth?

        ii) Depth of Management talent or backup for present managers.

        iii) Engineering and scientific talent.

        iv) Skilled, semiskilled, and unskilled labor. What quality and quantity are available within the company and in surrounding areas.

        v) Morale and loyalty of employees.

d. Facilities:

   i) Number, size, location, type, and modernness of manufacturing plants, warehouses, and offices.

   ii) Types, kinds, condition and adaptability of manufacturing equipment.

   iii) Accessibility to transportation, raw materials, and markets.

   iv) Operating and maintenance costs.

   v) Excess capacities.

e. Market Considerations:

   i) Total market for present product lines.

   ii) Reasons for not having a larger share of the market.

   iii) Market structures. What are the customer characteristics, the geographic locations of markets, products substitutes and life of present products in the market?

   iv) Seasonal and other important cyclical factors.

   v) Competitive position by product.

   vi) Channels of distribution (types, number and strength).

   vii) Market research ability.

   viii) Brand recognition.

   ix) Type and cost of advertising and sales promotion.

f. Scope of Corporate Charter:

2. Check list for determining venture goals.

   a. Business prospects and directions for the next ten years:

      i) Projected technological, economic, and market trends.

ii) Horizontal and vertical diversification of product lines.

iii) Expansion of present product lines.

iv) Entry into new related and unrelated fields.

v) Entry into frontier fields (atomic energy, space flight, solar energy).

b. Financial condition and structure of business in view of projected venture plans.

c. Technical objectives as related to manpower, organization, facilities and financial strength.

d. Plants, locations, facilities and manpower required for products in relation to raw materials and markets.

e. Marketing objectives:

i) Type of markets.

ii) Size and share of markets.

iii) Advertising.

iv) Methods of distribution.

v) Service and replacement parts.

3. Check list for organizing the venturing function.

a. Formal Organization:

i) Objectives, scope, responsibilities, and structure of venture planning operation.

ii) Accountability and authority of individuals charged with venture planning functions.

iii) Reporting and relationship responsibilities of personnel.

b. Venture planning policies:

i) Improvement, expansion of lines, diversification of products.

ii) Technical development work (internal or subcontract).

iii) Acquisition of new companies, or mergers.

iv) Technical policies. To what extent is the company willing to invest in technical leadership?

v) Manufacturing policies. To what extent is the company willing to invest in substantial or specialized facilities?

vi) Facilities policies. What are the company attitudes on questions of geographical location; buy or lease; build or buy?

c. Overall Timing:

i) Schedule for timing of organization development and changes.

ii) Schedule for planning and implementation of all venture policies to ensure orderly and synchronized operations.

C. Corporate Venture Groups

The information required to make decisions involving proposed ventures includes precise and difficult to qualify elements. New products fail in the market place because someone or some group made a mistake concerning these elements. No single department can be held responsible for these mistakes and top management does not have time to direct proposed ventures with the attention that they require and deserve. Thus, gradually, companies are turning to one individual heading a team of specialists, to be placed in a position of responsibility and authority for venturing efforts.

1. Need for Venture Teams.

The venturing failure rate is substantial. Booz, Allen and Hamilton have conducted surveys which indicate that only 30% of total

of total staff time and expense costs of proposed ventures are spent on successful products.[18] Seventy percent of the investment is lost. Their findings also indicate the relationship between the calendar time necessary to screen, analyze, develop, test, and commercialize new products and the expenditure for expense items plus capital investment. Interesting is the fact that only 13% of the time is taken up by screening and analyzing new products while some 87% of the time is taken by development, testing, and commercialization (see Exhibit 2).

There are three possible reasons for this poor allocation of time:

1. Organizational formats that virtually ensure failures.
2. Diffusion of responsibility and authority.
3. Leaders who do not function well under conditions of risk or uncertainty.

In order to overcome these difficulties, company managements must recognize that the venture development effort requires an intergration of a wide range of skills. All the functional areas such as finance, engineering, marketing and production must be included and given their proper emphasis. It is necessary to rest authority and responsibility for venturing with one adventurous man or one venture team directed by one adventurous man. New product oriented companies need venture teams of professionals who are comfortable in situations of business uncertainty and high risk, not committees or marketing vice-presidents.

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[18] Management of New Products, p. 17.

The venture team should be organizationally independent of executives and other departments, reporting only to the chief executive. This places the team in a position to combat the financial vice-president who wants to keep a lid on spending, the engineering management who do not believe in the venture because it can't be produced with present equipment, and the sales manager who objects to the venture because it can't be marketed through existing distribution channels.

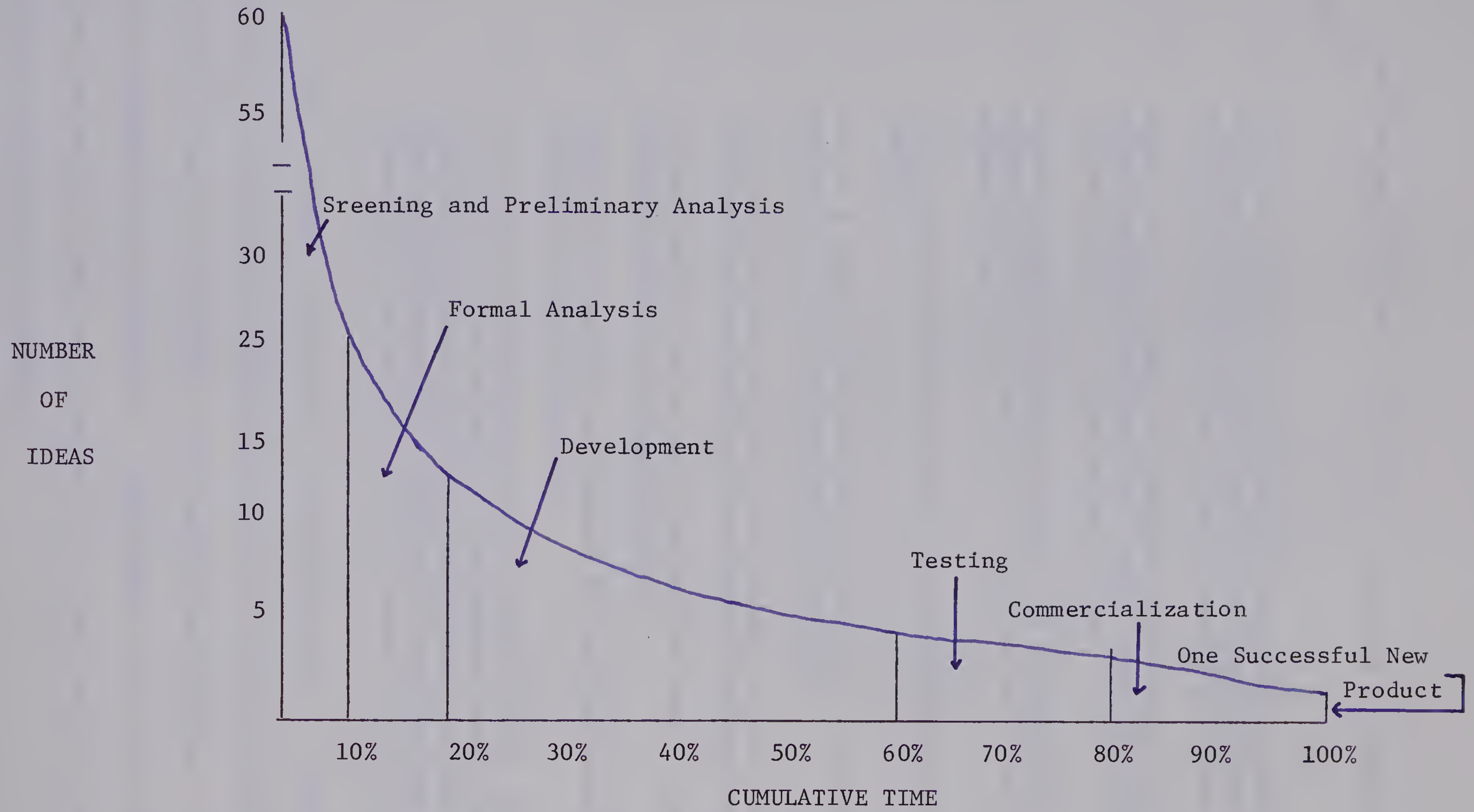
2. Responsibility of Venture Teams

The head of the venture team, reporting directly to the chief executive, should be given complete responsibility and authority for all ventures in the new product development program. This authority should include the ability to demand supporting services from all other functional operations. What is needed is a definite mandate to act, not assumptions of cooperation.

The venture team should be responsible for the various screening and analytical steps as well as any product or market testing required. Control of a proposed venture should remain with the corporate venture team through all stages of development including commercialization. Venture plans cannot be allowed to result from chance innovations or demands of competitors if product leadership is a prerequisite. This responsibility must be deligated for continuous venture planning, including the coordination of personnel, departments, and research time.

EXHIBIT 2

COMULATIVE TIME TO COMMERCIALIZE NEW PRODUCTS



Source: Management of New Products, (New York: Booz, Allen & Hamilton, Inc., 1960), p. 17.

The responsibilities of the venture team may be summarized as follows:[19]

1. Plan the venture or stimulate the venturing process, bringing creative minds together and insuring that an organized comprehensive forward planning job takes place.
2. Establish long range and immediate time tables and priorities for venturing, and supply constant pressure to insure that the time tables are met.
3. Evaluate product ideas and plans, and present this information to management for decisions on a complete and objective basis.
4. Keep pressure on lower priority but potentially profitable ventures.
5. Act as a single point for the collection of all venture proposals, without organizational barriers.
6. Serve as a system of checks and balance for the information and opinions developed in the course of venture programs.
7. Be the guiding hand to make certain that venture programs proceed according to sound practice.
8. Supply a single point of contact for outside consultants working on venture programs.
9. Be a central communication center that is fully informed on all activities relating to new product works, that can dessimulate information to all interested departments and bring to the appropriate personnel's attention the information that might alter the course of a venture.

A major benefit arising from the establishment of venture teams assigned with the preceeding responsibilities is effective communication and an orderly flow of information. The venture team acts as a clearing house for information (See Exhibit 3). Responsible only to the chief executive, the venture teams only mission is to find, develop, and commercialize profitable new products.

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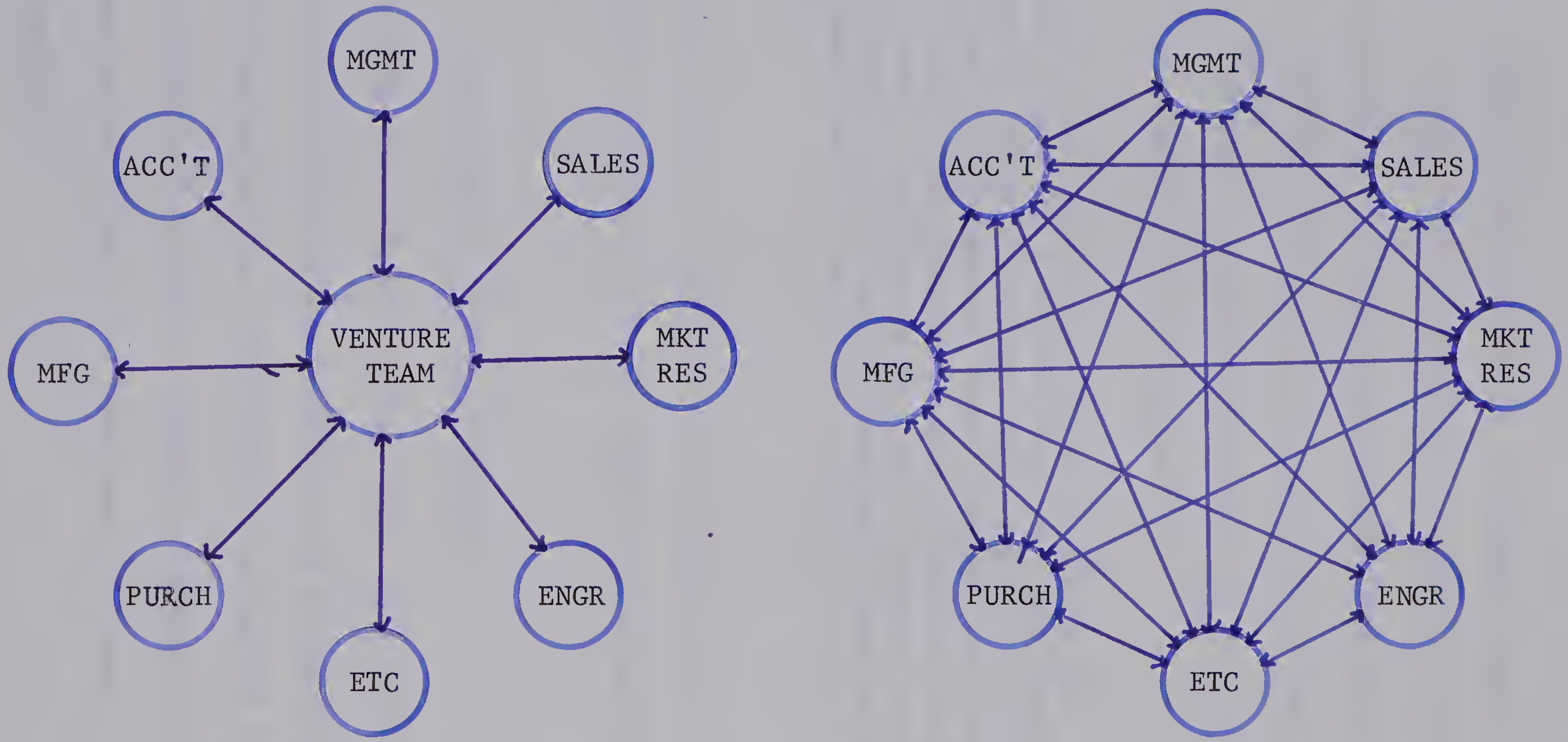
[19] J.H. Murphy, "New Products Need Special Attention," Journal of Marketing, Vol. 26 (Oct., 1962), p. 47.

EXHIBIT 3

VENTURE TEAM - CLEARING HOUSE FOR INFORMATION



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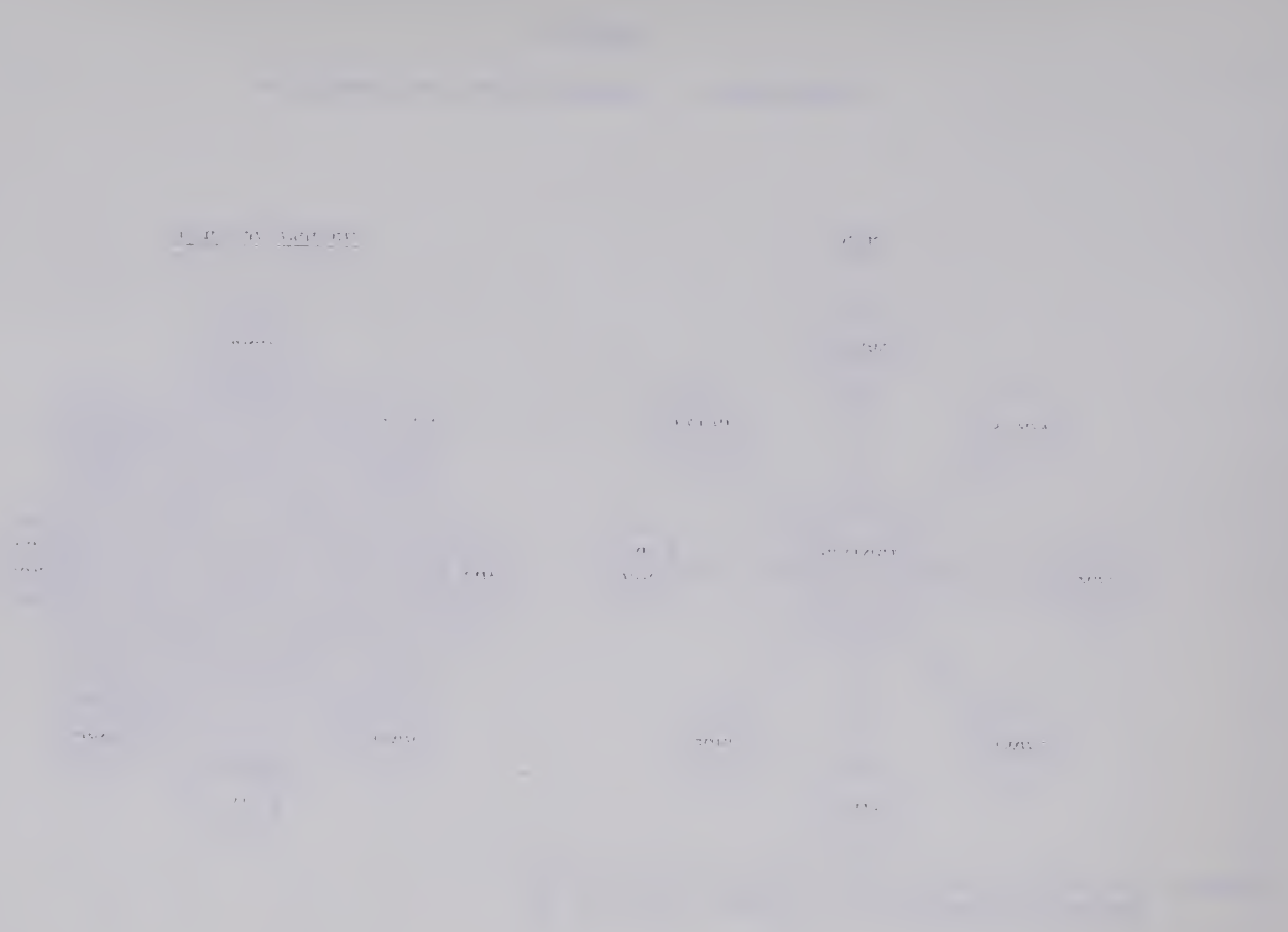
Source: J.H. Murphy, "New Products Need Special Attention," *Journal of Marketing*, Vol. 26 (Oct., 1962), p. 48.



3. Leadership

The venture team described requires a commander with a rare combination of talents. These include organizer, analyst, gambler, inventor, dreamer, and leader. The versatility demanded from the leader of the venture team is implied in the following quote from "Marketing and the New Science of Planning", a presentation made at the 1968 Fall Conference of the American Marketing Association:[20]

> "When the chief executive officer selects a man he should look for a man who keeps his own counsel but who is receptive to new ideas; he should look for a man who is imaginative, even a dreamer, but one who can visualize the dreams and make them come true; he should seek an aggressive but not a dogmatic man, an authoritarian who is not dictatorial, a man who will use committees for advice and council but not as a crutch."

To insure the chances of success, of the venture team requires a leader with outstanding abilities, his own budget, organizational status, and authority.

D. The Scope of Venture Planning

A trade-off developes between cutting short the planning function of venturing and risking serious mistakes and extending it, risking delays in entering the market. The solution naturally falls somewhere between too little and too much. Certain criteria will assist in determing the optimum point within this spectrum, by identifying the significant factors involved:[21]

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[20] Robert L. King, ed., Marketing and the New Science of Planning, (New York: American Marketing Association: 1968 Fall Conference Proceedings), Series No. 28, p. 454.

[21] Robert E. Weigand, "How Extensive the Planning and Development Program," Journal of Marketing, Vol. 26 (July 1962), pp. 56-57.

1. Appraisal of strategic factors; the venture manager must appreciate the number and significance of the strategic variables involved in determining the success of his venture. He must secondly evaluate the degree to which they are strategic, whether a mistake would be fatal, or seriously impede profitability, or whether it could be corrected in time. Finally, he must then evaluate his own ability to relate the facts of the situation to the risks involved in the strategic factors.

2. Speed of feed-back: The capacity to detect errors quickly and inexpensively shortly after the product has been placed on the market is extremely important to determine how extensive the planning and development should be. Where information is quickly fed back to the firm, the cost of a mistake is substantially less than when the process is lengthy.

3. Capacity to correct mistakes: For most products there is little opportunity for the firm to correct mistakes after the consumer has already purchased the product. The disgruntled customer simply does not repeat the purchase. There are some products however, which do facilitate the correcting of mistakes. Products such as automobiles, through the use of franchised service departments can furnish repairs and simultaneously make a limited number of minor adjustments or corrections during the initial stages of the product's life.

4. Time length of the commitment: Where the commitment is long term, substantially more care must be used in arriving at a decision. This means a much more intensive investigation of the product and it's market. Where a plant has been constructed and the product cannot be

changed at the whim of a technician, the firm is commited for a considerable period of time. The venture manager must ask himself to what extent an initial decision freezes him to a certain level of quality, price, etc. If backing out of a position is relatively easy, a mistake need not be viewed as seriously as when the commitment is long term.

5. Product line implications: The impact which a mistake may have upon other products, must be assessed. If a new product is presented as one of a family or products, a successful venture can add to the image of that line. But the reverse can also occur. If a product turns sour on the market, it may adversely affect the whole line.

6. Desire for secrecy: A desire for secrecy may limit the product or market testing that can be done. The venture manager must recognize that in the use of some research techniques, he clearly outlines for the benefit of competitors, those elements of business strategy which he may later pursue. In many instances the value of the information gathered does not offset the loss of secrecy which accompanies the testing program.

7. Competitor's position: If a desire to be first on the market is sufficiently important, the extent of investigation may depend upon the evaluation of the closest competitive product and the possibility of its development. In instances where the nearest competitor's lagtime is known to be relatively brief, the venturer may choose to minimize or even eliminate some of the steps which would otherwise be a part of the development program.

The effective evaluation of the above factors may encourage or even impel more thorough testing, or on the other hand, permit or even force elimination or minimization of certain steps in the development process. The important point is the awareness of these factors and the ability to weigh their importance accurately in order to arrive at an effective balance between a too lengthy and costly investigation and a dangerous urge to be first on the market. Quantitative techniques for analyzing these factors will be discussed in depth in the following Formal Analysis section.

Decisions concerning products, product mix, product lines, and product diversification tend to determine the character of the firm. Under competitive situations, the threat of a new or improved product may be serious. The innovator can often safely assume that at some point, imitative competition will appear. While such competition will help in expanding the use of a new product more quickly and widely, the innovator during this period should attempt to bring out an improved or new product in order to hold his product leadership.

Venturing is simply another aspect of the creative process exhibited in modern societies. For the western world, the significance of innovation seems to be an essential element in the perpetuation of capitalism and the free enterprise system. The inter-play between markets and products creates a concept of iterative new product development around which many products seem to have a life of their own. The concept of product life cycles and evidence of prevailing product characteristics tend to reinforce this organistic view.

III

PRODUCT CHARACTERISTICS

The concept of a product seems simple enough, yet there is some difficulty in knowing exactly what it is. An automobile for instance, may be viewed physically as an assembly of fixed and moveable parts, coming in a variety of sizes, shapes, and colors. To the buyer, the product is composed of these elements, plus the services which are made available as part of the entire package. But the automobile as a product to the buyer is more than just the package described as it does more than provide transportation. It may provide pleasure or be a status symbol. It may provide customer satisfaction or fill a consumer need. A product is defined by the user.

Most companies market more than one product whether it be retailing, wholesaling, or manufacturing. Retail companies such as Eaton's and The Bay are good examples of multi-product organizations. When these companies are dealing with more than one product, they have found it useful to define three levels of product aggregation. These are:

1. Product Item: "A specific version of a product that has a separate designation in the seller's list."[22]
2. Product Line: "A group of products that are closely related either because they satisfy a class of need, are used together, are sold to the same customer groups, are marketed through the same type of outlets or fall within given price ranges."[23]

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[22] Philip Kother, Marketing Management (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1967), p. 289.

[23] Eugene J. Kelly, Marketing: Strategy and Functions (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1965), p. 114.

3. Product Mix: "The composite of products offered for sale by a firm or a business unit."[24]

Product mix is further defined as having a width and a depth. The width of the product mix refers to the number of product lines which are found within a company. The depth refers to the number of product items included within each product line.

Exhibit 4 illustrates the product mix of a company at a point in time. Because most products are characterized by a limited life, this mix will change with time as new products are added and old products are dropped.

EXHIBIT 4

PRODUCT MIX

Depth

Product Line 1	1a	1b	1c		
Product Line 2	2a				
Product Line 3	3a	3b	3c	3d	3e
Product Line 4	4a	4b	4c		

Width

Number of items: 12
Number of lines: 4
Average depth: 3

Source: Philip Kother, Marketing Management. (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1967), p. 290.

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[24] Ibid., p. 114.

A. Product Life Cycles

The maintenance of a well balanced product line requires an understanding of new product development timing and existing product life cycles. Product life cycles are patterns of development which have been indicated by typical products. An example of a product life cycle is shown in Exhibit 5 which suggests that there are four distinct stages during its life.

These recognizable product stages through which a product passes during its lifetime occur in the following order:

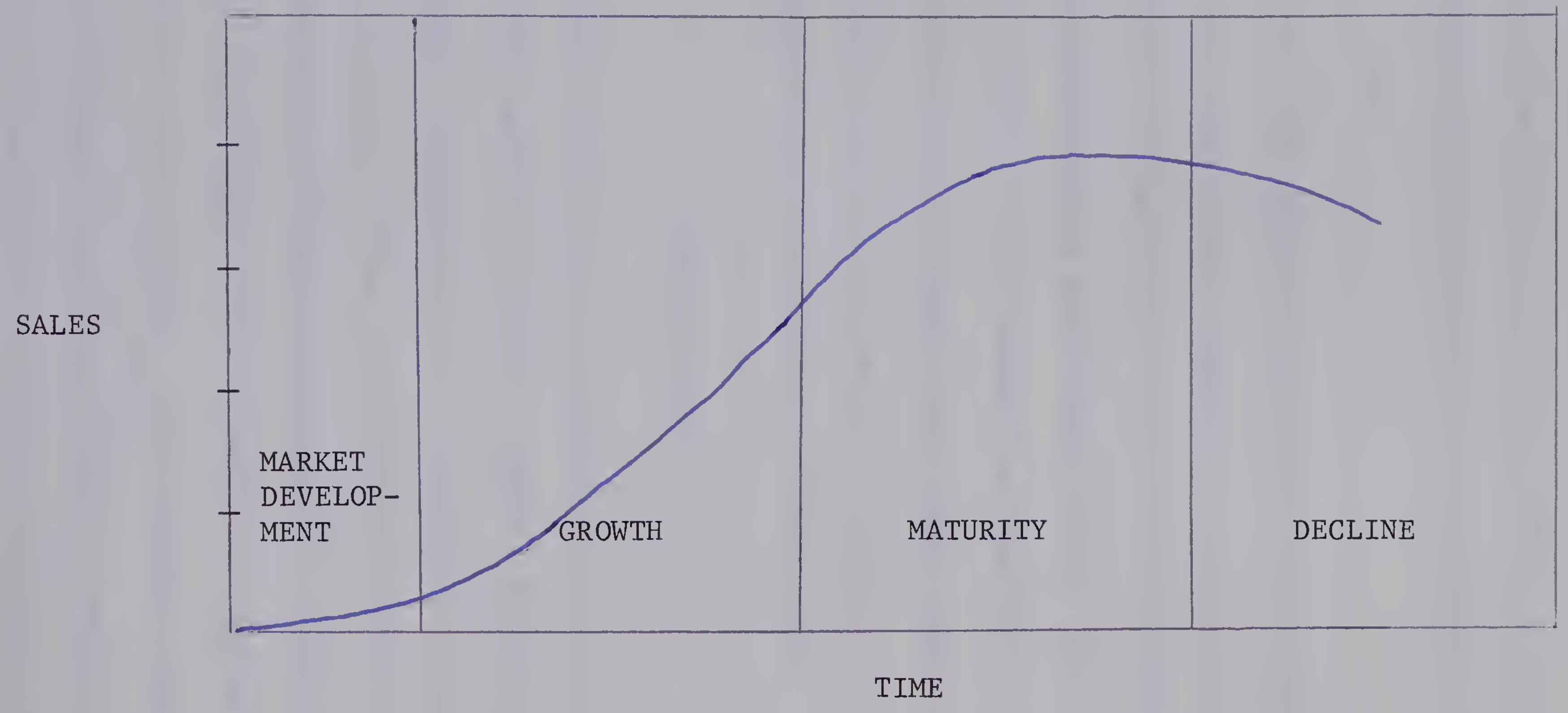
1. Market development
2. Market growth
3. Market maturity
4. Market decline

1. Market Development

Market development is the process of developing, testing, and introducing a new product to the market. This stage occurs before there is a proven demand for the product and before the product has been technologically proven. During this period, times are froth with uncertainties and risks. Demand in some cases has to be created during this initial market development stage. The length of time required to develop a new product depends upon that product's complexity, its degree of newness, its fit to customer's needs, and the presence of competitive substitutes. It has been demonstrated that properly customer - oriented new product development is one of the primary conditions of sales and

EXHIBIT 5

PRODCUT LIFE CYCLE



Source: Theodore Levitt, "Exploit the Product Life Cycle," Harvard Business Review, Vol., 43 (November - December, 1965), p. 82.

profit growth. It has also been demonstrated that associated with new product development are raging costs and frequent fatalities. In fact, as discussed earlier, most new products don't have a classical life cycle curve. Instead, from the very beginning they have a descending curve as the product not only does not get off the ground, it goes quickly under.

The large cost and numerous fatalities associated with new product development have caused many companies to accept a more conservative approach. Instead of attempting to be the first company to develop a new product, they systematically avoid being first. They let others take the initial step and then, when demand has been proven, quickly follow suit. They are willing to accept this second effort on the basis that they will be able to develop a comparable product only slightly after the first innovator gets his product off the ground.

2. Market Growth

At some point shortly after a product has been developed, demand occurs and sales begin to increase. This is the beginning of the market growth stage. Competitors with a conservative approach now begin to enter the market with either carbon copies of the original product or with functional and design improvements, causing product and brand differentiation to develop. The innovator now instead of attempting to persuade comsumers to try the product, must persuade them to prefer his brand. This generally requires important changes in marketing, strategies and methods. However the marketing strategies and methods which will now be open to him are limited due to the presence of competitors.

As consumer acceptance accelerates, it becomes relatively easy to expand existing distribution channels and retail outlets. Consequently the filling of distribution pipe lines generally causes an exaggerated impression of sales and of profit opportunities. This in turn attracts more competitors. The market, now saturated with competitors, moves the industry into the next stage of competition.

3. Market Maturity

The market maturity stage is the first sign of market saturation. Most consumers and households that are sales prospects now own or use the product. Population increases now determine the growth rate of the product or the industry. Distribution channels are filled. Price, brand preference, and finer differentiations in the product, customer services, and in the promotional practices for the product become the main means of holding customers. During the market development stage the innovator depended heavily upon the positive efforts of his retailers and his distributors to help sell his product. He must now communicate directly with the consumer more than ever. The innovator must appeal to the consumer more on the basis of price and marginal product differences such as packing and advertising. He must also appeal to special market segments. The market maturity stage can be passed through rapidly, or it can persist for generations with per capital consumption neither rising or falling.

4. Market Decline

When market maturity tapers off and finally comes to an end, the product is in the market decline stage. The over capacity that was apparent during the period of maturity now becomes overwhelming. In most cases

companies are unable to weather the storm of competition. They may attempt to improve management, try more cunning tactics, attempt merges, and other activities which in general make life troublesome for all firms in the industry. But in the end, production finally becomes concentrated into fewer and fewer hands.

The shape of the product life cycle will naturally vary from product to product, and from environment to environment. The length of the life cycle or of any particular stage is dependent on three factors:[25]

1. The rate of technical change.
2. The rate of market acceptance.
3. The ease of competitive entry.

The death of a product is not inevitable. The straight pin for example, has been used for ages and probably will continue to be used for many years to come. The decline of a product can be retarded by the search and discovery of new uses, new users, and new characteristics or modifications. To some, this would be considered as a new product but using a definition of technological newness or market newness, this type of modification would not produce a new product, but would effect the products life cycle as illustrated in Exhibit 6.

The importance of product life cycles to product planning is in the knowledge of where current products are in their particular cycle. Assuming a complete cycle can be predicted, the maximum time that will be available for developing replacement products can be determined, thus

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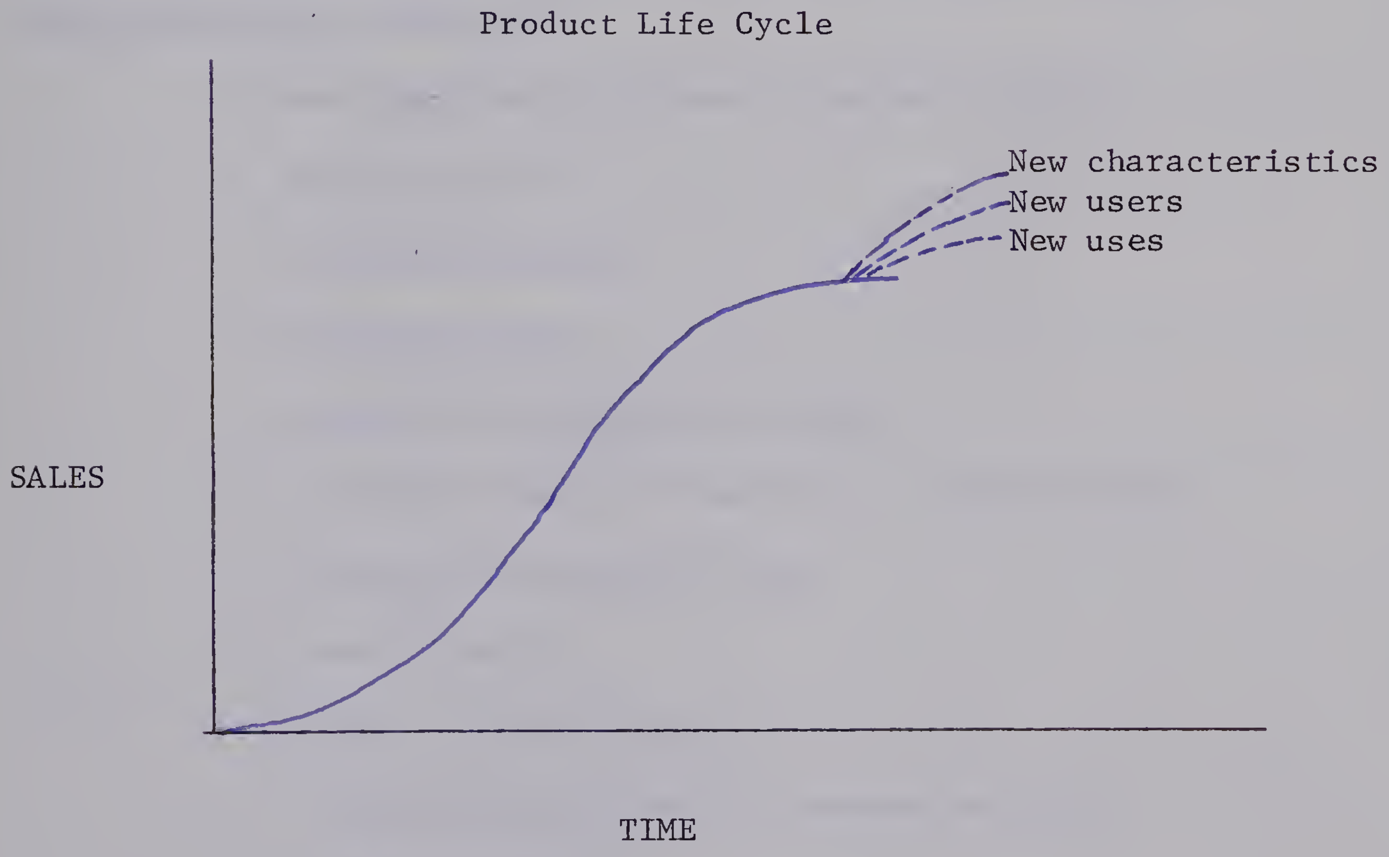
[25] Joel Dean, "Pricing Policies for New Products," Harvard Business Review, Vol. 28 (November - December, 1950), p. 28.

insuring the continuance of a complete product line. The prediction of life cycles for proposed ventures will provide a more meaningful analysis of profits and rates of return, and in turn indicate when a second generation of new products will be required.

EXHIBIT 6

PRODUCT LIFE CYCLE - EXTENDED



B. New Products Defined

1. Product Differentiation

The term "new product" covers a wide field. Products which are not entirely new but only differentiated to some degree from existing product lines have been classified as new products. Many terms are in common use such as improved products, new uses, new markets, elated products, innovations, etc. In this sense any form of product differentiation may be considered as a part of product planning and may include all of the following activities; which have been termed as methods of differentiating a product:[26]

1. new functional features to present products
2. improved styling
3. improved packaging
4. improved service
5. expanded present product lines
6. contracted number of models for standardization
7. diversify new product line
8. improve quality
9. change pricing policy
10. find new applications for present products
11. find new markets
12. introduce new and better methods of distribution
13. finance and build new facilities
14. find a better product name

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[26] Karger, "An Over-all Look." pp. 94-95.

2. Product Newness

The listing of activities differentiating a product does not answer the question of "what is a new product". A more sophisticated approach is a classification of new products by objectives suggested by Johnson and Jones.[27] Their classication is illustrated in Exhibit 7.

This approach by objectives assumes that there is a degree of newness which may be expressed in two dimensions; the technological newness and the market newness. A product is conceived by matching a technology and a market, the degrees of which Johnson and Jones have defined as follows:[28]

> Improved Technology: "To utilize more fully the company's present scientific knowledge and production skills."
>
> New Technology: "To acquire scientific knowledge and production skills new to the company."
>
> Strengthened Market: "To exploit more fully the existing markets for the present company products."
>
> New Market: "To increase the number of types of consumers served by the company."

By matching a technology and a market, Johnson and Jones have defined the following new product classifications:[29]

> Reformulation: "To maintain an optimum balance of cost, quality, and availability in the formulas of present company products."
>
> Replacement: "To seek new and better ingredients or formulation for present company products in technology not now employed by the company."

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[27] S.C. Johnson, "How to Organize," p. 52.

[28] Ibid., p. 52.

[29] Ibid., p. 52.

EXHIBIT 7

CLASSIFICATION OF NEW PRODUCTS BY PRODUCT OBJECTIVE

INCREASING TECHNOLOGICAL NEWNESS

INCREASING MARKET NEWNESS

PRODUCT OBJECTIVES	NO TECHNOLOGICAL CHANGE	IMPROVED TECHNOLOGY	NEW TECHNOLOGY
NO MARKET CHANGE		REFORMULATION	REPLACEMENT
STRENGTHENED MARKET	REMERCHANDISING	IMPROVED PRODUCT	PRODUCT LINE EXTENSION
NEW MARKET	NEW USE	MARKET EXTENSION	DIVERSIFICATION

Source: S.C. Johnson, and C. Jones, "How to Organize For New Products," *Harvard Business Review*, Vol. 35 (May - June, 1957), p. 52.

Remerchandising: "To increase sales to consumers of types now served by the company."

Improved Products: "To improve present products for greater utility and merchandisability to consumers."

Product Line Extension: "To broaden the line of products offered to present comsumers through new technology."

New Use: "To find new classes of consumers that can utilize present company products."

Market Extension: "To reach new classes of consumers by modifying present products."

Diversification: "To add to the classes of consumers served by developing new technical knowledge."

The majority of so-called new products are basically variations of existing products. One way of differentiating a new product is "to consider a product that is still unknown by name or application to a large percentage of potential users as a new product."[30]

C. New Product Development

1. Development stages

Having defined a new product in terms of this technology and market newness, let us turn to the route it takes from original conception to final market introduction. In chronological order, the steps followed to introduce a new product are;[31]

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[30] Kelly, Marketing, p. 80.

[31] Edgar A. Pessemier, New Product Decisions - An Analytical Approach (New York: McGraw Hill Book Co., 1966). See also Johnson "How to Organize for New Products." for a slight variation.

1. Search: the locating of ideas which can add profitable new products to a firm's existing product lines or replace a product which has reached its maturity and is now in the decline stage.

2. Preliminary analysis: low cost studies designed to quickly eliminate weak areas of search and weak proposals and informally indicate the potential of promising proposals.

3. Formal economic analysis: detailed studies to appraise the proposals which survive preliminary testing resulting in recommendations to either scrap or proceed.

4. Development: The process of turning an approved proposal into a tangible product.

5. Product testing: a re-testing of earlier judgements by testing the proposed new product in the actual market place or through panel boards, etc.

6. Commercialization: Full scale production and marketing operations.

Indicating the search time and survival rates for proposed ventures is the time pattern shown in Exhibit 8, prepared by Pessemier, which illustrates the risk of failure and the casualty rate of new proposals and ideas.

The typical amount of time spent in generating a proposal is less than a year, while a few proposals require much more than a year. The majority of proposals are dropped during preliminary analysis and a substantial number of those surviving this analysis are eliminated by formal analysis. The importance of preliminary analysis and formal analysis is in keeping costs to a minimum. Relatively small allocations

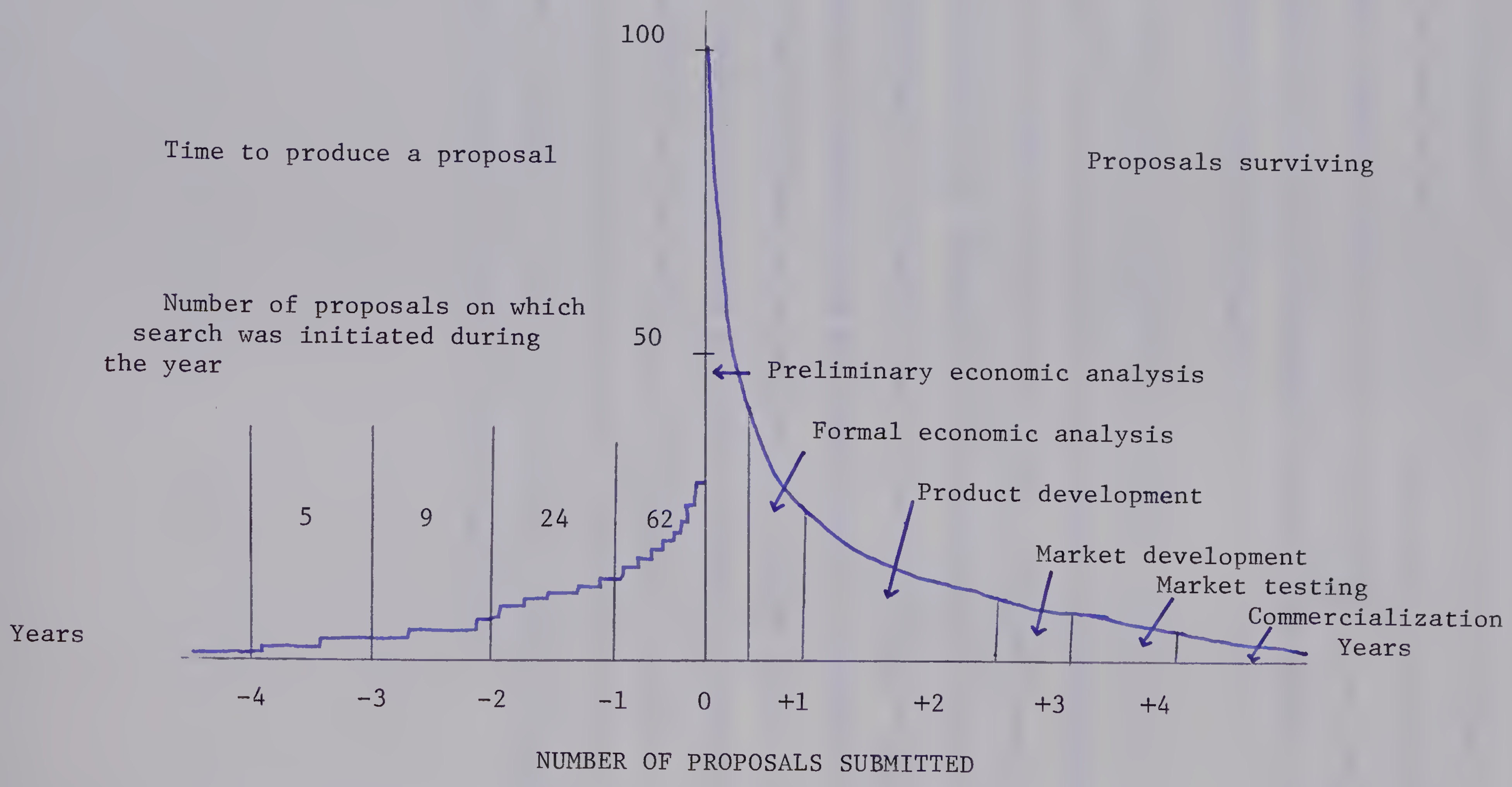
of resources are required to complete these two types of analysis whereas development proceedings require the application of greater sums of money and costs begin to rise sharply. The time between approval for development and the introduction of the product may be long and expensive, therefore, the more accurate the preliminary and formal economic analysis, the more profitable the allocation of development money. Careful screening or proposals during early analytical stages will reduce costs by reducing the risks of commiting large sums of money to developing, testing, and marketing products which will eventually fail. However, the analysis should be such that it does not eliminate or discard proposals which would ultimately have proven successful.

2. Development timing

The timing of new product development should be looked at in relation to the life cycles of existing products. New product planning should provide new products to replace old products which are in the process of termination. In this light, the life cycle concept has major implications for marketing stragety. Assume that a firm has a new product which lasts or has a life of three years. The item has been developed and is now ready for introduction or commercialization on a national scale. Initially, the marketing strategy may be to emphasize heavy advertising, intensive selling to channels of distribution and special introductory inducements to consumers. Later as the product matures and enjoys consumer acceptance, competitive products will most likely be introduced. During this stage of the products life, the marketing strategy may be directed toward price appeals, or product

EXHIBIT 8

SEARCH AND SURVIVAL TIME PATTERN



Source: Edgar A. Pessemier, New Product Decisions - An Analytical Approach, (New York: McGraw-Hill Book Company, 1966), p. 12.

improvements. Finally as the product approaches the end of its life cycle, the strategy may be to recover costs but keep the brand or product name before the market while search for a new product is intensified. Proper product planning would have had a new product in the development stage to eventually act as a replacement for the dying product, long before it became a matter of urgency.

To this point, the importance of product planning to an organization and the characteristics of a product have been discussed. In relation to the funds spent on a new product, the most crucial stage in product planning is the decision to drop a proposal, defer it, or to move on to development. Of major concern then is guiding decisions in the early stages of planning, and the development of a framework within which new product decisions can be made with a minimum of risk and delay. This involves preliminary and formal analysis to determine a new products feasibility at the earliest possible time. The risk can never be taken out of new product development but certain practices can increase the likelihood of success. This is the purpose of venture management and the techniques employed are those of "venture analysis".

IV

VENTURE ANALYSIS

Venturing is an attempt to make innovation more predictable and less random. It represents a corporate effort to manage its new business development program as a continuing commitment rather than as a sporadic or periodic crash program.[32]

The successful development of new products involves a high degree of risk and danger. Failures are an inevitable but necessary part of an aggressive new product development program. Lack of occasional failure probably indicates that one is not taking enough calculated risks. The newer the product, in terms of technology markets, the greater the risks of failure. Willingness to accept these failures as a part of venturing is not a common quality, but with a set of procedures specifically designed to reduce failure rates, their burden can be reduced.

"Venture analysis" is a technique or set of procedures used to assist new product decision making when risk and uncertainty is present. It is "a technique of economic planning for the commercialization of new products"[33] and "is concerned with guiding decisions in early stages of planning."[34] The technique will vary between firms and products but provides a flexible tool which may be developed and exploited by venture teams considering new product proposals. Venture analysis endeavors to

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32. Hanon, "Corporate Growth." p. 45.

33. Sigurd L. Anderson, "Venture Analysis - A Flexible Planning Tool," Chemical Engineering Progress, Vol. 57 (March, 1961), p. 80.

34. Ibid., p. 80.

introduce early in the development process, the inherent risks of forecasting and possible counteractions of customers and competitors in an attempt to reduce the desire to delay decisions when faced with these uncertainties.

According to Anderson, there are four troublesome characteristics which venture analysis will assist in isolating and analyzing, allowing decisions to be made on the basis of firmer knowledge. These characteristics are:[35]

1. Complexity of the market, investment, and cost factors influencing the decision of venture.
2. Multitude of alternatives to be evaluated.
3. Risks introduced by forecast uncertainties.
4. Possible counteraction by consumers and competitors.

The number of decisions and the number of uncertainties involved are large. To analyze all the venture alternatives available would require extremely large numbers of man hours. However, with the assistance of computers, analysis of this nature is now possible. Venture analysis attempts to organize the available information pertaining to a venture and indicate the logical structure of decision making, by the accomplishment of the following goals:[36]

1. To organize the relevant facts and judgements in mathematical form.
2. To find key data missing from the process and that is required for analysis, and specify the additional information required.

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[35] Ibid., p. 80.

[36] Ibid., p. 83.

3. To structure the risk and game aspects of the venture decision, clarifying the pattern of venture stimulation required.
4. To exploit the computer's ability to calculate rapidly and cheaply, permitting the placement of numbers on the risk and game aspects of decisions.

Even though computing the potential of very large numbers of alternative strategies is possible and practical, it does not in itself enter the decision making problem. It does however, provide the decision maker with a firmer background of knowledge upon which to make his decision, namely an idea of the risks and possible outcomes associated with each alternative, which may be compared to other alternatives and criteria of economics and risk. The ability to generate the possible results of a large number of alternative strategies makes analysis of risk economically feasible.

Each new proposal of new product venture presents its own evaluation requirements, but venture analysis provides the framework within which evaluations may be made. The benefits derived from implementing the venture analysis approach are in viewing new products decisions in relation to all other activities, and the ability to compare alternative strategies based on similar analysis.

A. Preliminary Analysis

Preliminary analysis as defined in Part III, consists of low cost studies designed to quickly eliminate weak areas of search and weak proposals and informally indicate the potential of promising proposals. This analysis is extremely important because the effectiveness of the following stages of analysis are limited by the venture ideas which are uncovered and approved for further study and development. Companies employing a formal new product program cannot rely on random or spontaneous new idea creation. They must attempt to seek out new ideas in a systematic way, making the most out of all sources available to them.

1. Venture Sources

The likelihood of finding "good" venture ideas increases as the number of ideas generated increases. Therefore, it is essential to make the most out of every source available. The search for venture ideas may be of two general types;

1. Formal large scale search for entirely new ideas or new technologies.
2. Periodic effords to uncover useful modifications to existing products.

These two types lie at either end of the scale with actual activity ranging anywhere in between. The first type requires lengthy periods of time, large sums of money and its value is difficult to predict. The latter type involves relatively small sums of money and realizes results more quickly as the characteristics of the results are usually defined in advance.

The major sources of venture ideas are customers, scientists, competitors, company personnel (especially salesmen), and top management. Customers provide an important source of ideas either through their complaints about existing products or through formal discussions between customers and management to determine the merits and shortcomings of existing products. According to Alex Osborn, the technique of brainstorming may be used effectively with consumer groups.[37] For example, Osborn describes a panel of consumers who produced 136 ideas in forty minutes when asked the question "What new products not now available are needed in the home?" Among the ideas were bed sheets with double strength in the middle where wear first occurs, suction cups on the bottom of egg-beaters so that they wouldn't skid around in the bowl, and switches for doorbells so that you can turn them off when you don't want to be disturbed.

Technology advances provide a major source of ideas. The potential of research in this area has lead companies such as Du Pont, International Business Machines and many others to establish their own research departments making large annual expenditures through these departments for basic research. Other companies have been satisfied with establishing applied research departments to capitalize on discoveries made elsewhere.

New products introduced by competitors or products still in the development stages by competitors should be studied closely. Trade sources and salesmen can be used effectively in obtaining information of

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[37] Alex F. Osborn, Applied Imagination (New York: Charles Scriber's Sons, 1958), p. 174.

the competitors activities. Closely following the activities of competitors will not put you on the market first but will insure that you will not be far behind. Salesmen are in constant contact with customers and therefore will have firsthand information concerning customer dissatisfaction, satisfactions, and needs. They are often the first to learn about competitive activities.

All venture ideas need not be internally created. The wide range of idea sources can be seen from Exhibit 9, which lists where several manufacturers located ideas for new products.

Not all sources will be useful to every firm. To direct search into the right areas, a checklist of major sources that comply with a firm's interests and objectives may be beneficial. One such checklist is shown in Exhibit 10.

The venture manager should outline the areas for new product exploration for he knows the capabilities of his organization and is in the best position to determine the type of ideas required. Working from strength, he might direct search toward areas which would complement existing products, utilize existing channels, or utilize existing production capabilities, technology or raw materials. Working from the company's weaknesses, he might direct search into areas which would offset highly seasonal or cyclical sales.

EXHIBIT 9

SOURCES OF NEW PRODUCT

COMPANY	NEW PRODUCT	SOURCE OF IDEA
Machine tool builder	Textile machinery	Examination of machinery needs of noncustomer industries.
Meat packer	Onion soup	Executive's wife
Electric appliance manufacturer	Foot warmer	Customer Enquiries
Manufacture of golf equipment	Golf bag "toter"	President of company
Chemical and film company	Detergent	Laboratory
Manufacturer of plastic products	Film viewing devise	Inventor
Canner	Apple juice	Food Broker
Film Company	Film	Engineer
Chemical products company	Insecticide	List of Government - owned patents available for licensing
Plumbing equipment and supply	New washer	Sales report
Pottery manufacturer	New vase	Museum exhibit

Source: Gustav E. Larson, "Locating Ideas for New Products," in Product Strategy and Management, ed. by Thomas Berg and Abe Schuchman (New York: Holt, Rinehart and Winston, Inc., 1963), pp. 420-421.

EXHIBIT 10

CHECKLIST FOR IDEA SOURCES

1. Company staff, record, experience

Research and engineering staffs
Sales staff
Market research department
Sales reports and other records
Employee suggestions
Customer suggestions, inquiries and complaints

2. Distributors

Brokers
Factory distributors and agents
Wholesalers and jobbers
Retailers

3. Competitors

Customers of competitors
Competitors products
Mail order catalogue
Exhibits and trade shows
Foreign products

4. Miscellaneous

Inventors
Patent attorneys and brokers
Firms going out of business
Manufacturers of parts and accessories
Suggestions from public as a result of advertising
University and institute laboratories
Commercial laboratories
Industrial consultants
Management engineers
Product engineers
Market research agencies
Trade associations - executives and laboratory personnel
Advertising agencies
Trade magazine writers and editors

5. Government Offices

Patent Offices
Publications
Technical Services Offices

Source: Gustav E. Larson, "Locating Ideas For New Products," in *Product Strategy and Management*, ed. by Thomas Berg and Abe Schuchman (New York: Holt, Rinehart and Winston, Inc., 1963), p. 424.

2. Methods of Search

Three relatively simple methods for obtaining new product ideas are synectics, heuristics, and brainstorming. Synectics is a creative problem solving technique where, given a problem, a team of highly trained people from different fields is set up to attack it. While synectics can be applied formally, it should be an almost automatic by-product of a well constructed venture management approach for this approach is designed to involve all functional areas within a firm.

Heuristics are methods and rules established to facilitate creative problem solving. The use of heuristics to create new product ideas can best be demonstrated by an example of a checklist for changing a product. The Osborn checklist follows:[38]

1. Put to other uses? New ways to use it? Other uses if if modified?
2. Adopt? What else is like this? What other idea does this suggest? Does the past offer parallels? What could I copy? Whom could I emulate?
3. Magnify? What to add? More time? Greater frequency? Stronger? Larger? Thicker? Extra value? Plus ingredient? Duplicate? Multiply? Exaggerate?
4. Modify? New Twist? Change meaning? Color, motion, odor, form, shape? Other changes?
5. Minify? What to substitute? Smaller? Condensed? Minature? Lower? Shorter? Lighter? Omit? Split? Understate?
6. Substitute? Who else instead? What else instead? Other ingredients? Other materials? Other processes? Other power? Other place? Other approach? Other tone of voice?
7. Rearrange? Interchange components? Other patterns? Other layouts? Other sequence? Transpose cause and effect? Change pace? Change schedule?

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[38] *Ibid*., p. 318.

8. Reverse? Transpose positive and negative? How about opposites? Turn it backward? Turn it upsidedown? Reverse roles? Change shoes? Turn tables? Turn other cheek?

9. Combine? How about a blend? An alloy, an assortment, an assemble? Combine units? Combine purposes? Combine appeals? Combine ideas?

Brainstorming is the bringing together of all persons involved with a problem (and sometimes persons who are not). Each person is expected to throw out as many ideas as possible no matter how wild. No criticism is permitted and the ideas are taken down in notes to be reviewed after the session in a calmer atmosphere. The rationale of brainstorming is that a group atmosphere will lead one idea into another and more ideas will be generated than if each person attempted it alone. Brainstorming was accepted with great favor during the fifties but has since come under considerable criticism for its value in discovering new product ideas as it tends to waste a great deal of time.[39] During a session, each person has only a limited amount of time for expressing his own ideas. It also fails for problems requiring sequential thinking as ideas are not followed up by the group. This group approach is best suited to problems such as naming a new product where the undisciplined atmosphere will likely cause names to be suggested that otherwise would not have been.

3. Search Analysis

New product ideas require screening to evaluate each proposed product or idea in terms of its instrinsic worth or merit, and to make comparisons with other possibilities. This initial testing is less

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39. Reynolds, Products and Markets, p. 34.

rigorous than the investigations to follow but is important. If mistakes are made during this preliminary evaluation stage, potentially succesful products will be rejected or product ideas which will prove unsuccessful are given the go-ahead and started through the stages of formal analysis and development. Search activity may be broadly defined as the effort required to uncover possible revenue producing activities. This search is costly and search directed in an area which will prove not fit for further pursuit by the company will simply be a waste of time and money. It is possible to view the problem in four ways.

1. Search for products in the same classification as existing products.
2. Search for products which can be handled by existing plant facilities and distribution channels without regard to their relationship to existing products.
3. Search for proposals which may have profit possibilities regardless of whether they can be produced or marketed through existing facilities.
4. Search for proposals in relation to artistic, technical and scientific capabilities.

Ideas derived from these areas, should fall within long range plans and objectives of the firm. In most circumstances, a firm is capable of judging its own ability to research and handle each search area presently undertaken. Based on the findings, the elimination of existing search activities or the addition of others should take place until the firm reaches an effective or efficient intensity of search and preliminary evaluation, maintained in the most promising areas.

During the initial stage of an idea or proposed venture, tentative decisions will have to be made on such major items as:

1. Does the product satisfy a customer need and does it appeal to their wants?
2. What marketing strategy would help to ensure the product's success?
3. What will the product do for the company?
4. How does the product fit into the rest of the existing product line and the company's overall objectives?

A favorable decision about a new product proposal requires the commitment of many resources. Therefore, even a tentative decision concerning a new proposal should consider the type of resources that will ultimately have to be commited. This requires a careful look at the company's inventory of resources. Suggested areas to be considered are presented in Exhibit 11.

Several factors in addition to company resources requiring tentative analysis at this stage are:

1. Costs; What costs are associated with the proposed product? These costs should include both introductory and continuing costs as well as any costs effect of the new product on existing products.
2. Profits; What profit potential does the proposal have the short and long run?
3. Competition; How will the competition react to the new product?
4. Market size; What is the potential size of the market?
5. Fit; Does the proposal fall within the company objectives as laid down in the product in the product policy and does it fit the current product strategy?
6. Risks; Does the proposal involve any special or unique risks which sould be evaluated as a separate consideration.

EXHIBIT 11

INVENTORY OF COMPANY RESOURCES

Financial Strength	-money available or obtainable for financing research and development, plant construction, inventory, receivables, working capital, operating losses in the early stage of commercial operations.
Raw Material Reserves	-ownership of, or preferential access to, natural resources such as minerals and ores, brine deposits, natural gas, etc.
Physical Plant	-manufacturing plant, research and testing facilities, warehouses, branch offices, trucks, tankers, etc.
Location	-situation of plant or other physical facilities with relation to markets, raw materials, or utilities.
Patents	-ownership or control of a technical monoply through patents.
Specialized experience	-unique or uncommon knowledge of manufacturing, distribution, scientific fields, or managerial techniques.
Personnel	-payroll of skilled labor, salesmen, engineers, or other workers with definite specialized abilities.
Management	-professional skills, experience, ambition, and will for growth of the company's leadership.

Source: Charles H. Kline, "The Strategy of Product Policy," *Harvard Business Review*, Vol. 33, (July - August, 1955), p. 92.

The majority of search areas can be eliminated through general discussions by the venture team with the managers and personnel of the functional areas concerned. Areas of search yielding proposals which are beyond the company's resources or which are associated with excess costs, poor profits, excessive risks, etc., can be eliminated quickly and inexpensively by these discussions.

If, after elimination by discussion, the number of search areas remains too large for a firm to handle economically, the venture team must take steps to further reduce the areas. One method for accomplishing this reduction, suggested by Edgar A. Pessimer, utilizes estimates of cash flows related to the number of proposals which may be generated by each area.[41] This method has the added advantages of determing the intensity of search which should be carried out in each area surviving the analysis and of facilitating the setting of standards for judging proposals originating from these search areas. The steps involved in Pessemier's method are:

1. Members of management and experts in the various fields associated with the area of search would be asked to estimate the longest expected economic life and the largest capital investment which could be associated with new product proposals generated from a particular area of search. They would also be asked to estimate the smallest increment in capital investment and an economic life from which meaningful distinctions could be drawn. (Usually $100,000. and one year would be the smallest increments acceptable for useful information.) Working with the estimates

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[41] Pessemier, New Product Decisions, pp. 43-51.

received, a matrix would be constructed similiar to that shown in Exhibit 12. When the search process creates enough proposals to be considered, acceptable for consideration, each type of outcome associated with that area is given a cell in the matrix. Cells at the extreme edges of the matrix represent proposals with either low investment requirements and long lives on high investment requirements and short lives. Seldom would these extremes warrant consideration.

2. Each cell in the matrix would now be examined to consider the expected timing of cash flows. The investment cash flows associated with any one cell would normally occur early in the life of the proposed product, while the earnings cash flow could occur early in the life of the product but would normally occur in the later stages. If expected patterns of cash flows differ to any degree within one particular cell, a third diminsion would be set up by dividing a cell into subsells. Exhibit 13 is an example of an expanded cell for an investment of $100,000 and an expected economic life of 5 years, representing one cash flow pattern for the darkened cell in the matrix developed in step one. Each additional cash flow would require a similiar subcell cash flow pattern. The number of subcells would depend on the number of distinctly different cash flows associated with each cell.

3. Step three estimates the percentage of all new product proposals that will fall into each cell. If there are subcells, the percentage given to that cell must be broken down and distributed to its associated subcell. The distribution of the total earnings cash flow outcomes are also estimated. The estimates established for the total new product proposals falling within a cell are placed in the lower right

EXHIBIT 12

AREAS OF SEARCH MATRIX

ECON LIFE CAP INVEST	1 YEAR		5 YEARS		LONGEST ECON LIFE
$100,000			▨		
LARGEST CAP INVEST					

Source: Pessemier: New Product Decisions, p. 47.

EXHIBIT 13

AREAS OF SEARCH MATRIX - EXPANDED CELL

A1	ECONOMIC LIFE 5 YRS		CAPITAL INVESTMENT $100,000			
TIME PERIOD YEAR	EXPECTED % OF INV CASH FLOW IN A PERIOD	EXPECTED % OF EARN CASH FLOW IN A PERIOD	OUTCOME IN $ OF TOTAL EARN CASH FLOW	EXPECTED % OF OUTCOME IN THIS CELL WITH CASH FLOW IN 4	% RATE OF RETURN FROM OUTCOME IN $	EXPECTED % OF ALL OUTCOMES
1	2	3	4	5	6	7
1	90	10	0 - 99	40	--	.8
2	10	20	100 - 199	25	25	.5
3		30	200 - 299	20	51	.4
4		30	300 - 399	10	73	.2
5		10	400 - 499	5	92	.1
TOTAL	100	100		100		2.0

Source: Pessemier, New Product Decisions, p. 47.

hand corner of the cash flow pattern in Exhibit 13, which in this case is 2.0. The distribution of earnings cash flow is indicated in columns 4 and 5.

4. The rate of return for each possible outcome can now be calculated as step four. This would be accomplished by locating the discount rate which would equate the earnings and the investment cash flows over the economic life for each cell. This discount rate would be the firm's rate of return on the investment required for that particular proposal. Only those areas of search of cells with rates of return equal or greater than the firm's opportunity cost of capital would be considered to have potential. All other areas of search would be discontinued or delayed.

The use of Pessemier's method enables the firm to choose search areas with the highest rate of return. Areas could be added until the annual available funds for search and capital investment were exhausted or all potential areas of search were included.

4. Levels of Acceptance

Proposals from some areas of search may vary greatly in terms of desireability while other areas produce a more homogeneous flow of proposals. Selecting the latter areas of search, would result in a reduction of risk, and increase the likelihood of locating acceptable proposals, but possibly at the expense of rate of return. By lowering the cutoff for acceptable rates of return, the inherent risks of search in one area may be lowered, due to the shortened waiting time between proposals. Conversely, the higher the standards of acceptance, the

longer the expected time between locating acceptable proposals. As this time period increases, predicting the number and timing of acceptable proposals located in any given year becomes increasingly difficult resulting in an unstable search program. Lowering cutoff rates of return will increase the acceptance rate and enhance stability, but it may also reduce the overall return on investment from the search policy.

New products are subject to risk and the degree of risk typically influence the rate of return at which proposals will be accepted. The higher the risk, the higher the acceptable rate of return becomes. There is a certain limit to the intensity of search and the portion of unacceptable proposals that a company is willing to investigate. But, there is also a risk of rejecting or proceeding with a proposal on the basis of faulty preliminary evaluations, or unreasonable levels of acceptance. To combat these, the venture team must focus their attention on two major areas early in the venturing process:[42]

1. An economic criterion of profitability, and
2. A philosophical viewpoint on risk taking.

B. Formal Analysis

Preliminary analysis has been designed to limit the areas of search and eliminate proposals of relatively low potential. Proposals having successfully passed this stage are subjected to extensive formal economic analysis.

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[42] Ibid., p. 40.

Through this formal analysis, relevant information is assembled, sifted, and analyzed to facilitate the decision to move the proposed out of the concept stage to the building of a prototype, development, and testing.

Choosing the best of alternatives depends upon the knowledge of all possible outcomes associated with each alternative. The venturer should "choose that course of action which, on the average, leads to the best payoff."[43] Locating the best payoff requires subjective estimates of the likelihood that any particular outcome will occur. These estimates are expressed as probabilities.

1. Probability Theory

Probability is the term used to express the "degree of belief in the occurence of some more or less unique event."[44] For the purposes of venturing, these degrees of belief can be expressed numerically, conforming to the following axioms of probability theory:[45]

1. "A probability is a real number between 0 and 1 (including the end points) which is assigned to an event."
2. "The probability of an event which is made up of a set of mutually exclusive events is the sum of the probabilities of these subevents."
3. "The sum of the probabilities assigned to a set of mutually exclusive and collectively exhaustive events is equal to 1."

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[43] Ronald E. Frank, and Paul E. Gree, Quantitative Methods in Marketing (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1967), p. 12.

[44] Wroe Alderson and Paul E. Green, Planning and Problem Solving in Marketing (Homewood, Illinois: Richard D. Irwin, Inc., 1964), p. 105.

[45] Ibid., p. 106.

Since venture analysis occurs while ventures are still in the concept stage, the venturer "must rely on his experience and judgement regarding the assignment of weights to those possible states of nature which could represent the underlying 'facts of life', given the implementation of a particular course of action."[46] Probability then, is a method of dealing with uncertainties about the future by synthesizing available information about future likelihoods into a single number.[47]

2. Rating Techniques

One of the more elaborate and perhaps the best approach for rating proposed ventures has been developed by Edgar Pessemier.[48] Pessemier suggests studying three aspects of each proposal:

1. The general market characteristics of the products.
2. The degree to which the company can exploit the products technical and market characteristics, and
3. The overall risks and rewards inherent in investing the required capital.

The first step of the economic analysis for studying these aspects is a formal checklist or rating form. Pessemier has designed three forms to be used. The first two use rating scales to evaluate the market potential or the product and its potential for the company. The third form is a summary of the other two.

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[46] Ibid., p. 106.

[47] William R. King, Quantitative Analysis for Marketing Management (New York: McGraw-Hill Book Company, 1967), p. 42.

[48] Edgar A. Pessemier, New Product Decisions - An Analytical Approach (New York: McGraw-Hill Book Company, 1966), p. 82.

The first form has the analyst evaluate the market potential of the product by answering true or false questions and then giving his opinion as to what extent he believes his answer to be true.

The second form has the analyst evaluating the potential of the product for the company by rating questions concerning product features, substitute products, market image, etc. In addition, this form requires the analyst to compute the probability of marketing success, cost volume relationships, probability of technical success, non-recurring expenses, and investment requirements by year, expected rates of return by year, and rates of return big enough or small enough to occur one time in a hundred.

The third or summary form considers rates of returns, time tables, quantitative and qualitative product line side effects, estimated new revenue and investment, risk, and factors such as the business cycle, competitive action, general technology, market environment, sociopolitical environment, and the investment salvageable in the event of failure. It concludes with a recommendation.

The forms are designed to accommodate the maximum amount of information possible. The lack of ability for any one manager to fully complete the forms does not invalidate their usefulness but instead indicates the need for additional information and the areas of uncertainty surrounding the proposal.[49]

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[49] For a detailed account of this internal rating technique, see: Pessemier, New Product Decisions.

The successful evaluation of proposed ventures requires a set of criterion upon which they may be judged. Pessemier suggests that the rate of return of investment is an acceptable criterion.[50] Several characteristics of this criterion making it a sound basis for acceptance are:

1. This is a valuable and widely used indicator of the relative profitability of capital outlays. By using the same yardsticks, a company will be able to judge the effectiveness of a wide range of commitments.

2. The evaluation process must handle proposals which have a wide variance in economic life or life cycle. Rate of return on investment considers both the size and the timing of cash flows in and out of the company.

3. The rate of return approach provides estimates which can be compared to the opportunity cost of capital and related to the inherent risks involved.

3. Competitive Advantage and Company Compatability

The nature and extent of the competitive advantage of a company depends on the total company resources in relation to the competitive environment and the position of that company within the industry. The competitive advantage in turn determines or defines the potential market segment within the total industry that the proposed venture might enjoy.

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[50] *Ibid.*, p. 41.

This analysis requires tools and techniques to determine whether or not the company is in a position to create the new venture with the necessary features that would result in acceptable profits, and also, to visualize the competitive advantages the company could enjoy by developing the venture. The selection of ventures should be limited to those which have the potential to create the competitive advantage required to return a satisfactory rate of return. This competitive advantage depends on the degree of product compatability.

An evaluation matrix has been developed by B.M. Richman to determine a product's fit or compatability with the company's overall objectives and existing product lines.[51] This matrix has two basic functions. The first to rank and weigh various aspects of the company's resources to determine the competitive advantage enjoyed by the company in each of the aspects and in turn to determine the competitive advantage that may be passed on to a proposed venture.

The second function indicates the degree of product fit or compatibility. This matrix provides a means of ensuring that a venture is compatible with company objectives and existing product lines as well as determing the company's ability to handle such a proposal with available resources. The operation of this matrix is demonstrated in the following hypothetical example:[52]

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[51] Barry M. Richman, "A Rating Scale for Product Innovation," Business Horizons, Vol. 5 (Summer, 1962), pp. 39-41.

[52] Ibid., pp. 39-41.

The venture group has decided that for their firm, several areas of operation must be evaluated in order to determine their competitive advantage. Based on value judgements, a series of weights have been assigned to each of the areas considered important. These weights relect the competitive advantages that the venture group feels exist in relation to their competitive environment, after having considered the historical development of the company in terms of its talents, know-how and resources. The total of the assigned weights will equal 1.0 indicating the company's overall performance.

The operational or functional areas to be evaluated and the weights placed on each are as follows:

Marketing	.20
Research and Development	.20
Personnel	.15
Finance	.10
Production	.05
Purchasing and Supply	.05
Location and Facilities	.05
Company Personality and Goodwill	.20
TOTAL	1.0

The operational areas and their respective weight, once set, will remain the same for all ventures proposals to be analyzed except for occassional updating as the competitive scene changes.

The next step is to evaluate the venture proposal in relation to each of these areas, assigning values which reflect the compatibility of desired attributes and characteristics. In each area, a value between 0.0 and 1.0 is assigned depending on the degree of product compatibility. The closest fit gets a value approaching 1.0 and the poorest fit receives a value approaching 0.0. The assigned values are multiplied by the assigned weights and all net results added to produce the overall product fit. The assigned values for the proposal for each area under consideration are as follows:

Marketing	.7
Research and Development	.9
Personnel	.6
Finance	.9
Production	.8
Purchasing and Supply	.9
Location and Facilities	.3
Company Personality and Goodwill	.6

The results of the evaluation are illustrated in Exhibit 14.

The overall evaluation of the venture compatibility with company's objectives and its overall competitive position has been determined as .720. This places the venture relatively high in terms of compatibility with the company as a whole. A rating of 1.0 would indicate a perfect fit.

EXHIBIT 14

COMPATIBILITY MATRIX

AREA OF OPERATION	WEIGHTS	COMPATIBILITY	AXB
Marketing	.20	.7	.140
R and D	.20	.9	.180
Personnel	.15	.6	.090
Finance	.10	.9	.090
Production	.05	.8	.040
Location & Facilities	.05	.9	.045
Purchasing & Supply	.05	.3	.015
Personality & Goodwill	.20	.6	.120
	1.00		.720

By selecting venture proposals with a high rate of compatibility, a company should expect to increase the probability of selecting products which will succeed in terms of profitability. A rating approaching 1.0 implies that the company is capable to providing the necessary promotion, product attributes, and features to ensure an acceptable level of competitive advantage for the venture. By using simple probabilities and weighing techniques, the overall new product problem is reduced to a series of simpler ones, more easily and objectively solved. While this method deals exclusively with intangible factors difficult to quanlify, it does not add clarity and provides a systematics approach to a problem involving judgements of profitability.

A further breakdown of the above method adds even more simplicity. A second set of rating techniques over those required to determine compatibility in the first case can be employed. For this purpose, ratings are required for each of several aspects of each of the major operational areas. For example, the aspects involved in the operational area of marketing to which the proposed venture will be compared are:

a) Relation to present distribution channels
b) Relation to present product lines
c) Quality/Price relationships
d) Number of sizes and grades
e) Merchandisability
f) Effect of sales on present products

The proposed venture is compared to each of the above factors considered as important in the marketing area. To rate each factor requires the assignment of probabilities to a rating scale such as; Very Good, Good, Average, Poor, and Very Poor. The venturer must determine the probability of the venture fitting the factor under question. For example, assume that the venturer believes that there is a 50 - 50 chance that the Merchandisability of the product will meet the definition of Very Good, less chance of meeting the definition of Good, and even less chance of it meeting the definition of average. He believes that there is no chance of the product falling under the definitions of Poor and Very Poor. In this case, he may assign a probability of 0.50 for Very Good, 0.40 for Good, and 0.10 for average, giving no probabilities to Poor and Very Poor.

Subfactor weights are determined for each of the factors, with the weights assigned again equalling 1.0 reflecting the company's overall

ability in that operational area. The weights assigned to each factor are shown in column 2 of Exhibit 15.

The probabilities for each aspect of the operational area are multiplied by the weights assigned to each rating (i.e., Very Good, Good, etc.). The rating weights which are determined in advance and remain the same for all evaluations are shown just under each choice. The result is an expected value for each aspect under each choice. The expected values are totaled (column 8) and then multiplied by the weight assigned to each aspect, arriving at a subfactor evaluation. (column 9) The subfactor evaluations for all aspects of marketing are totaled giving one figure for the area of marketing. This figure of .714 can now be inserted into the matrix in Exhibit 14, showing a compatibility of .7. Similiar analysis can be performed for all operational areas.

4. Long and Short Run Profitability

An estimate of Long Run Profitability can also be used to make meaningful comparisons between a number of venture proposals. Exhibit 16 illustrates one method of making such an estimate.

EXHIBIT 15

EVALUATION SHEET FOR COMPATABILITY MATRIX

	2 Weight	3 Very Good 1.0		4 Good .8		5 Average .6		6 Poor .4		7 Very Poor .2		8 Total	9 Subfactor Evaluation 2 x 8
		EP	EV	EP	EV	EP	EV	EP	EV	EP	EV		
a) Relative to present distribution channels	.10	0.1	.1	0.2	.16	0.5	.3	0.2	.08			.64	.064
b) Relative to present product line	.10	0.1	.1	0.2	.16	0.4	.24	0.2	.08	0.1		.60	.060
c) Quality/price relationship	.30	0.3	.3	0.4	.32	0.2	.12	0.1	.04			.78	.234
d) Number of sizes and grades	.10	0.1	.1	0.2	.16	0.5	.3	0.2	.08			.64	.064
e) Merchandisability	.20	0.5	.5	0.4	.32	0.1	.06					.88	.176
f) Effects on sales of present products	.20			0.2	.16	0.5	.3	0.3	.12			.58	.058
	1.00												.714

Source: John T. O'Meara, Jr., "Selecting Profitable Products," p. 86.

EXHIBIT 16

LONG RUN PROFITABILITY

PROFIT MARGIN	PROBABILITY	CONDITIONAL PROFIT	EXPECTED PROFIT
(1)	(2)	(3)	(4)
10%	0.1	$ 10,000	$ 1,000
15%	0.1	15,000	1,500
20%	0.3	20,000	6,000
25%	0.3	25,000	7,500
30%	0.2	30,000	6,000
			$ 22,000

$$\text{Total expected profit as a percent of sales} = \frac{\$\ 22{,}000}{\$\ 100{,}000} = 22\%$$

Source: O'Meara, "Selecting Profitable Products," p. 89.

Colume one of Exhibit 16 lists the most logical profit margins that may be associated with the proposal under consideration. Column two shows the estimated probabilities of each of the profit margins occuring. Based on sales of $100,000, the conditional profits associated with each profit margin are calculated in column three. Column four expresses the expected profits determined by the probability of the conditional profit occuring. Totaling the expected profit column and dividing it by the annual sales of $100,000 results in total expected profits as a percent of sales of 22%.

An index of short run profitability or the potential of a venture to pay back the initial investment required to develop and commercialize it, has also been suggested by O'Meara. He isolates the following factors to equal development expenditures or the paybacks index:

a) Probability of commercial success - estimated by the venture group. This places a limit on the confidence of the sales projection.

b) Estimate of the average sales units per year - estimated by the sales of departments.

c) Estimate of the selling price per unit - estimated by the sales department.

d) Estimate of the cost per unit - estimated by the engineering and production departments.

e) Competitive grace period - estimated by the venture group. This attempts to define the time period during which no major changes in the product's market are expected (i.e., competitive products.).

f) Additional Working Capital Needs - estimated by the venture group in conjunction with the finance and production department.

g) Market development cost estimates - estimated by the venture group and the marketing department.

h) Additional Capital Expenditures - estimated by the venture group and production.

i) Product development cost - estimated by the venture group and production department.

The formula developed divides the product's probable short run profits by the estimated development costs as expressed by the following formula:[54]

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[54] Ibid., p. 88.

$$\frac{a \times b \times (c - d) \times e}{f + g + h + k} = \text{payback index}$$

If the following data were estimated for the above factors, the formula provides a payback index of 10.5.

a = 70%

b = $250,000

c = $5.00

d = $4.00

e = 3 years

f = $10,000

g = $10,000

h = nil

i = $30,000

By applying this formula to a series of venture proposals, the similiar indexes resulting will provide useful comparisons for isolating proposals with the highest potentials.

5. Bayesian Statistics

Bayesian statistics provides a framework for evaluating the economic costs of alternative courses of action under uncertainty.[55] The techniques of the Bayesian approach help answer two main questions:[56]

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[55] Paul E. Green, "Bayesian Decision Theory in Pricing Strategy," in Managerial Marketing, ed. by Eugene J. Kelly and William Lazer (Homewood, Illinois: Richard D. Irwin, Inc., 1967), p. 476.

[56] Alderson, Planning and Problem Solving, p. 208.

1. Should a decision be made now to continue or terminate a proposed venture, or should the decision be delayed pending the gathering of additional information?

2. Knowing when to make the decision, should it be continuation or termination?

The strength of the Bayesian approach is that probabilities based on managerial judgement and experience can be assigned even when quantitative information is lacking. It also permits the evaluation of time-related costs incurred during the time spent on venture reviews. Delaying a decision results in cost arising from both the time involved and the costs of gathering the additional information.

The decision to reject a venture proposal would result in a payoff of zero. A decision to proceed would be related to a series of future decisions up to and including commercialization before a payoff could be expected. The decision to delay the proposal, would cause changes in the payoffs during the time the proposal was shelved. During the time that a proposal is being delayed while additional information is sought, three groups of costs are involved:

1. The present value of future revenues associated with the proposal would be reduced due to starting the flow of revenues at a later date.

2. The present value of future revenues would be reduced due to the increased likelihood of competition.

3. The gathering of information is costly in terms of both money and time.

These costsof delay depend on a firm's rate of return, objectives, opportunity cost of capital, risk of competitive action and cost of accumulating additional information.

There are also certain costs involved when a decision is made too quickly. A decision maker moving too fast chances the possibility of incurring high cost associated with uncertainty, faces the possibility of having to scrap a proposal after having spent considerable sums of money on it.

Costs of delay and costs of acting too quickly can be related to time and to the amount of information collected. If the costs for uncertainty are high, the decision maker could suffer from moving too quickly. However, if the costs of wrong decisions are low, the decision maker should move quickly. Exhibit 17 illustrates these relationships of costs, time, and speed of decision making, indicating that additional information should reduce or eliminate the cost of uncertainty or additional information should not be sought. It also implies that time and money should be spent on collecting information until the costs of collection and delay and the expected costs of uncertainty are minimized. Bayesian statistics makes use to time - related costs to provide a basis for deciding "when to" and "what to" questions concerning new product decisions.[57]

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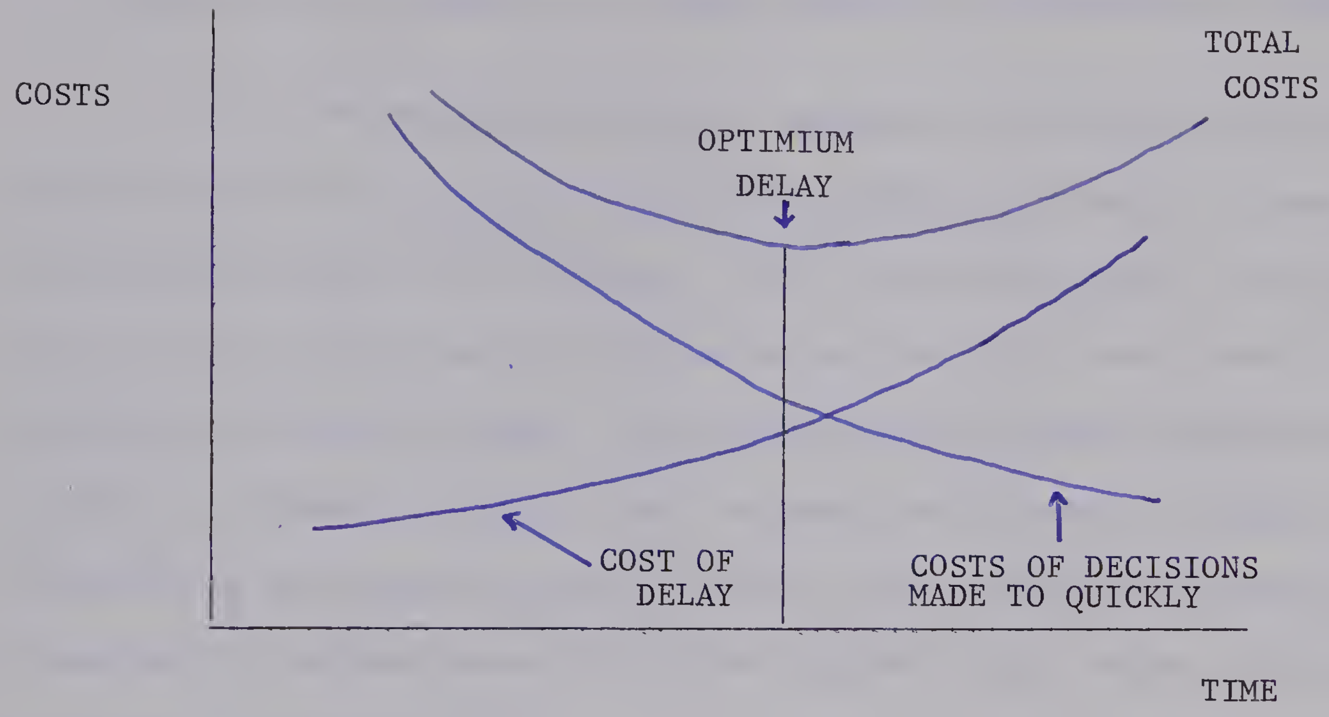
[57] Paul E. Green, "Bayesian Statistics and Product Decisions," Business Horizons, Vol. 5 (Fall, 1962), p. 89.

EXHIBIT 17

TIME - RELATED COSTS



Source: Martin Christopher, "Venture Analysis."

The Bayesian approach deals with the following aspects of decision making under uncertainty.

1. "Prior Analysis. Frequently in marketing planning problems the decision maker must rely on his business judgement alone; that is, the nature of the problem or the length of the planning horizon may preclude the opportunity to secure additional information bearing on the problem before a commitment must be made. In this case, the decision maker must decide solely on the basis of past experience.

2. "Posterior Analysis. Business experience is, of course, always changing as the decision maker secures feedback data from past courses of action. The revision of his prior judgements by incorporating new information is handled in a rather special way by Bayesian Theory."

3. "Preposterior Analysis. Sometimes the decision maker will have the option of delaying his decision pending the receipt of more information bearing on the problem. But, the decision maker will typically incur costs in obtaining the information and may also incur costs in delaying his original choice. Seldom will the additional information be perfectly reliable. He must, then, evaluate the wisdom of delaying the final choice and using this delay period to buy additional information regarding the unknown states of nature, against taking action without the additional information."[58]

Each of these aspects will be covered in the following example.[59] Assume that a point has been reached in the new product process where a decision has to made whether to:

1. move the proposal on to the next stage of development and build a prototype, or
2. delay the decision one time period while additional information is collected to confirm the potential of the proposal.

By delaying the decision one time period (one year), the firm can be assured of collecting more accurate information than it has at present. However, it will also incur additional costs due to delaying the commercialization of the product.

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[58] Alderson, Planning and Problem Solving, pp. 107-108.

[59] Summary example from Green, "Bayesian Statistics & Product Decisions."

At present, four estimates of possible sales or forecasts (FC) are available and probabilities (PF) have been assigned to each estimate, as illustrated in Table 1. From this information it is possible to calculate the expected payoff (EP) if the product were commercialized.

TABLE 1

CONDITIONAL PAYOFFS & EXPECTED VALUES

(000)

Decision	FC1	PF1	FC2	PF2	FC3	PF3	PC4	PC4	EP
Go	$-12	.15	$-1	.30	$5	.45	$10	.10	$1.15
No - Go	0	.15	0	.30	0	.45	0	.10	$ 0

(PRIOR ANALYSIS)

The expected payoff is determined by summing the product of each forecast times its probability. If no further information were available, the Go decision would be choosen because of the expected payoff of $1150.

The decision tree illustrated on Exhibit 18 shows the various decisions and routes available to the decision maker. The top branch represents the results of a No delay decision as in the preceeding Table 1. The estimated sales forecasts (extreme right) of the GO - decision, multiplied by their respective probabilities result in a payoff of $1150. Since this is higher than the $0 associated with no - go, this latter alternative is blocked off.

However, usually the decision maker can obtain additional information by delaying the decision. This additional information will have collection costs, delayed construction costs and will most likely

not be perfectly accurate.

Consider a delay of one time period. If interest rates are 10% annually, the payoffs after one year will only be 91% of the original payoffs due to the time value of money and the cost of delayed revenues. Also assume that the market share will drop to 75% from 100% due to increased competitive activity with the additional lead time allowed competitors. The cost of collecting the additional information is $150 and this information will only be 70% accurate. That is, if the market survey results indicate f1 (forecast F1 will occur), there is a 30% chance that this information could have been assembled if the true underlying sales potential were not F1, but actually F2, F3, or F4.

The conditional payoffs, reflecting the discount penalty for delay and the effect on market share are $-10,910., $-910, $3410., and $6820. A hypothetical market survey has come up with a result of f1, indicating that forecast F1 is the best estimate. Since additional information is only 70% accurate, the joint probability of survey result f1, and forcast F1 occurring is found by multiplying the conditional probability, P(f1/F1) by the prior probability in Table 1, P(F1). The joint probability is .70 x .15 = .105 which is assigned to F1 in Table 2. The conditional probability of observing survey f1, given the fact that the true underlying forecast is F2 , is assumed equal to .10 , as are F3 and F4 . Hence, the joint probability of survey f1 and forecast F2 occuring is .10 x .30 - .030 . The remaining cells in Table 2 are completed in the same manner. The marginal probabilities for f1, f2, f3 and f4 are found by summing the column entries.

TABLE 2

MARGINAL AND JOINT PROBABILITIES

Survey Results	Joint Probabilities F1	F2	F3	F4	Marginal Probabilities
f1	.105	.030	.045	.010	.190
f2	.015	.210	.045	.010	.280
f3	.015	.030	.315	.010	.370
f4	.015	.030	.045	.070	.160
TOTAL	.150	.300	.450	.100	1.000

(PREPOSTERIOR ANALYSIS)

Posterior probabilities shown in Table 3 work backwards to determine how likely it is that F1 was the underlying forecast knowing that f1 occurred. Since f1 has been observed, only the joint probabilities in the first row of Table 2 are relevant. The marginal or total of the joint probabilities for f1 is divided among the four forecasts F1, F2, F3 and F4 which could have produced the F1 result. The first row in Table 3 is derived by dividing each joint probability associated with F1 in Table 2 by the marginal probability. 190.

The second branch of the decision tree in Exhibit 18 illustrates the steps involved when a decision to delay one time period is made while additional information is collected. The conditional payoffs at the extreme right are the payoffs associated with the no - delay decision minus the penalties for the time value of money and a loss of market share.

TABLE 3

POSTERIOR PROBABILITIES

Survey Results	F1	F2	F3	F4	Total
f1	.553	.158	.237	.052	1.000
f2	.054	.750	.161	.035	1.000
f3	.041	.081	.851	.027	1.000
f4	.094	.188	.281	.437	1.000

If the market survey indicates that F1 is the best forecast (or f1 is observed) the best decision would be No - GO and scrap the proposal. Similarily with F2 . However, if either of F3 or F4 are confirmed correct the decision would be to go on to the next stage of new product development.

Working on the basis of expected payoff, the decision to delay the proposal one year results in a gross payoff of $1390 from which the information costs of $150 must be subtracted, leaving a net $1240. Comparing the two payoffs available at point A on the decision tree, the best decision would be to delay the decision for one year. This decision results from relating this decision to all decisions which can be visualized in the future.

In this example, Bayesian Statistics have provided a means to balance the costs associated with delay against the higher costs of uncertainty when a proposal is moved along too quickly.

6. Risk Analysis

There are numerous alternative routes to reach most goals. The problem is choosing among them. Risk analysis attempts to identify the inherent risks of each alternative so that an optimum trade-off between costs and benefits can be reached. This risk analysis concept is an essential component of the Bayesian Theory just discussed. It involves the development of subjective probability distributions for each key variable, to be obtained from experienced executives in the firm. By simulating the impact of possible variations in each of the variables, a series of overall returns of a venture can be predicted. The output is a distribution of possible returns, each with an associated probability.

The interpretation of risk analysis depends on the risk preferences of the venturer, the nature of which is illustrated in Exhibit 19. The risk averter is prepared to accept a lower return on ventures if the risks associated with the venture can be reduced. Conversely, the gambler is prepared to accept high risks as long as the payoffs are great.

7. Sensitivity Analysis

Bayesian statistics and risk analysis permit the conversion of venture problems under uncertainty into ones under risk, by making subjective probability estimates on the possibilities of various outcomes. Sensitivity analysis analyzes the sensitivity of the solution to the probability estimates.[61] The purpose of this analysis is to determine

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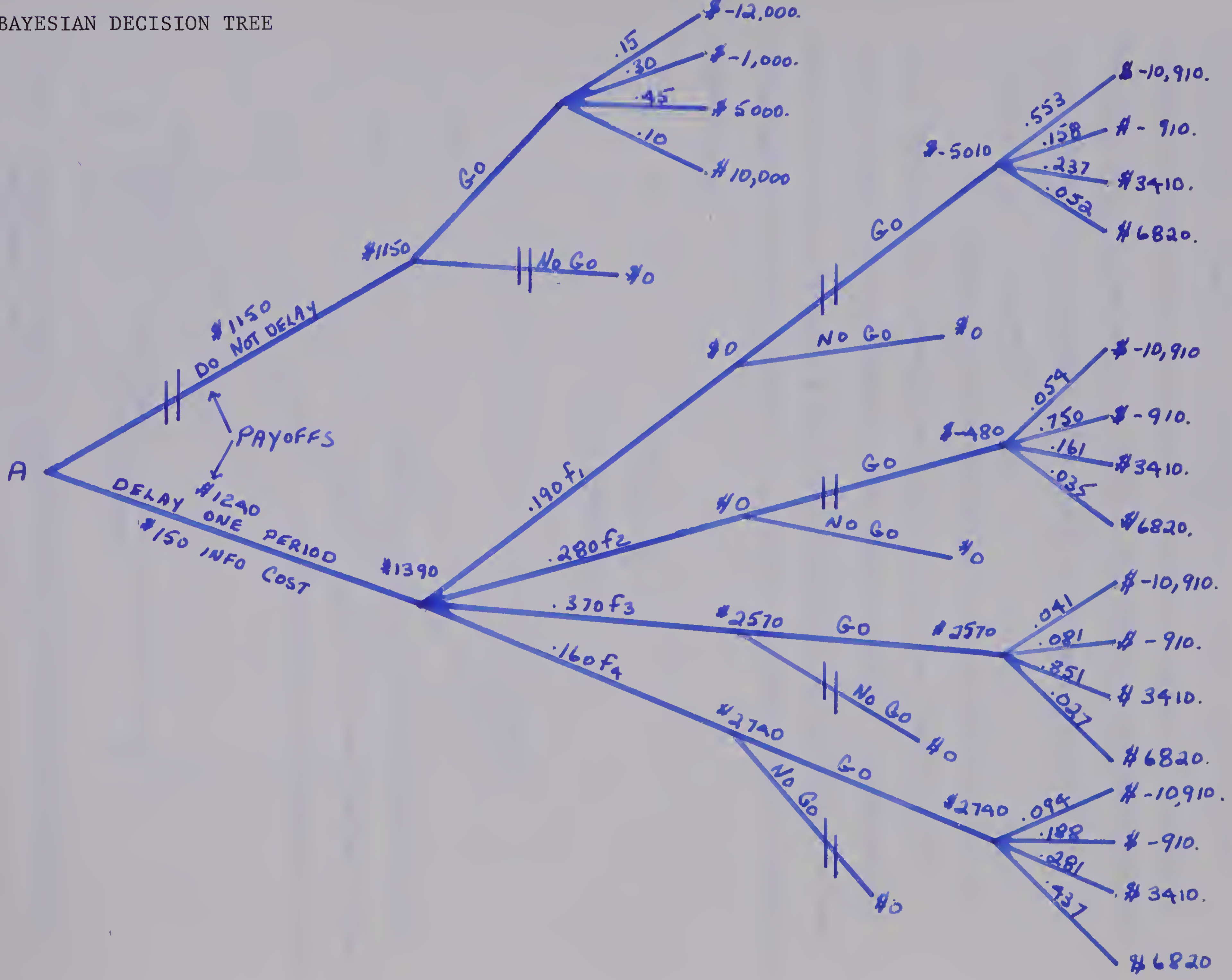
[61] King, Quantitative Analysis for Marketing Management, p. 62.

EXHIBIT 18

BAYESIAN DECISION TREE

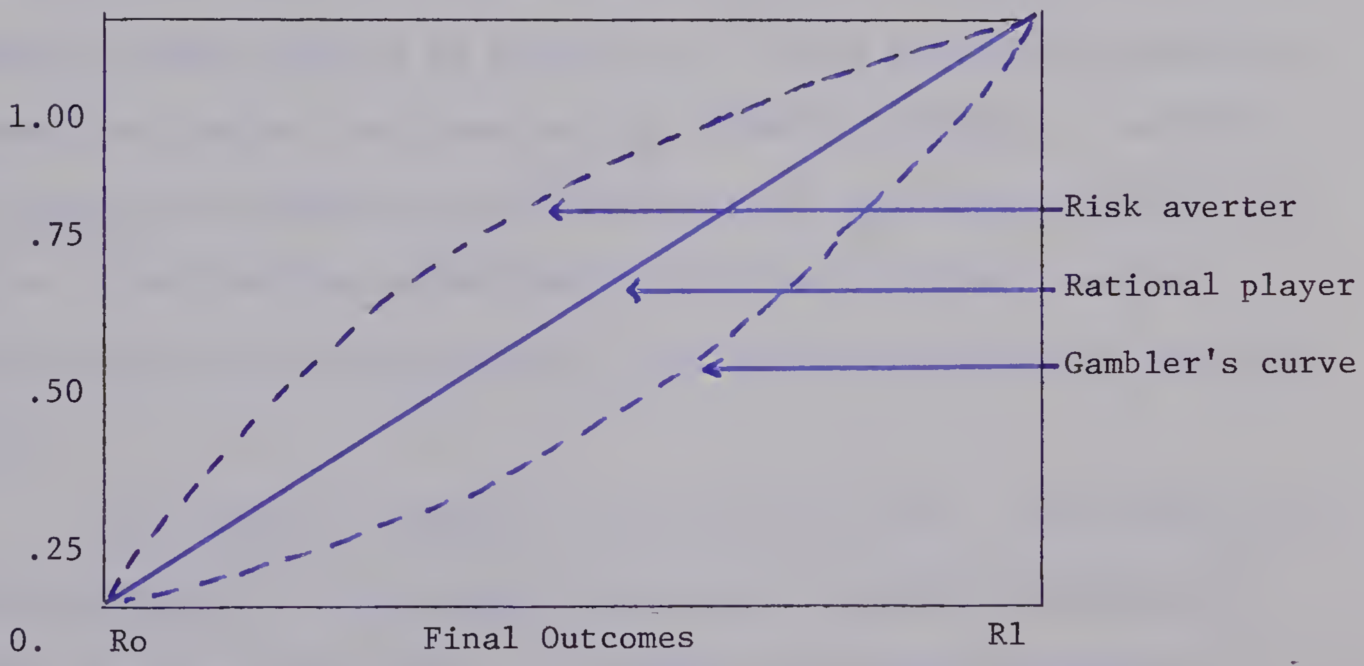


the functions, parameters, distributions, and inputs upon which the venture decision is most sensitive. Sensitivity analysis is useful in assisting the decision maker to allocate the limited resources available for measuring those aspects of the venture that make a significant difference in its outcome.[62]

The sensitivity of final outcome to any particular variable can be determined by altering that variable and then comparing the outcome based on the new input to the original outcome. Consideration should be given to running a sensitivity analysis on significant factors to explore the possible results of any errors in estimating the subjective probabilities.

EXHIBIT 19

RISK PREFERENCE



Source: Martin Christopher "Venture Analysis", University of Brantford Management Centre, p. 16

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[62] David B. Montgomery, and Geln L. Urban, Management Science in Marketing (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1969), p. 47.

V

CONCLUSION

The success of any company depends on the ability of its management to locate and develop new areas of profitability. This paper has presented Venture Management for the development of new products as one method of success.

Both the concept of venture management and the tools of venture analysis are currently under evaluation. The promise to constitute great benefits.

Many large and successful firms pursue an almost conscious policy of waiting for competitors to innovate, allowing their competitors to take the risks associated with venturing. The firm wishing to assume or maintain a position of product leadership must organize to do so and assume the risks inherent in innovation. Venture management provides a framework to furnish the organizational structure required. Venturers can operate as a seperate unit, liberating the innovation function from the day to day business activities of the firm. The most important benefit of the venturing approach is the increased imphasis on venturing itself.

New ideas for venturers are not hard to get. The problem is in getting good ones. It is toward this stage of product planning that venture analysis is directed. It provides a structured approach to generate, screen, and subject to detailed economic analysis new product ideas. It is not one technique but a flexible tool consisting of may techniques. Venture analysis has the advantage of evaluating activities

in relation to all other associated activities and comparing alternatives in a systematic way. The very nature of venture analysis requires the coordination of all departments and personnel within a company. Thus, the successful employment of venture analysis is dependent on the degree of implementation of the venture management concept.

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